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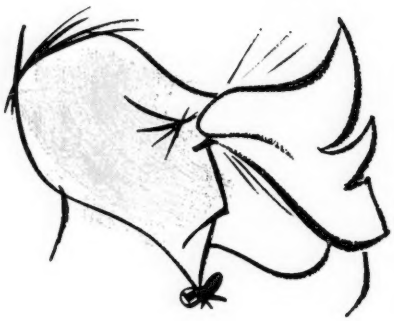

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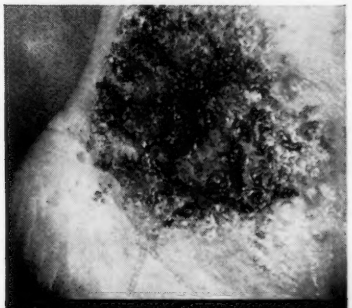

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The Industrial Medical Association was organized in 1915 as the American Association of Industrial Physicians and Surgeons. Its first annual meeting was held the following year. In 1951 the present name was adopted.

The purposes of the organization as stated in the certificate of incorporation (not-for-profit) are:

"The object of this Association will be to foster the study and discussion of the problems peculiar to industrial medicine and surgery; to develop methods adapted to the conservation of health among workers in the industries; to promote a more general understanding of the purposes of the medical care for employees; and to unite into one organization members of the medical profession specializing in industrial medicine and surgery for their mutual advancement in the practice of their profession."

Presently, the membership totals nearly 4000 physicians in the United States, Canada, Latin America, and other parts of the world. Physicians "who have an interest in Industrial Medicine" may apply for membership; specialization in this field is not essential. Regionally, the Industrial Medical Association has 14 Component Societies in the United States and one in Hawaii. Most Association members carry their membership through one of the component groups.

The Journal of Occupational Medicine, owned and published by the Industrial Medical Association, is sent monthly to each member as one of the advantages of membership.

The annual business meeting and convention is held in the spring. Since 1945, the convention has been held concurrently with the meetings of four other organizations having related interests—American Industrial Hygiene Association, American Conference of Governmental Industrial Hygienists, American Association of Industrial Nurses, Inc., American Association of Industrial Dentists. This combined meeting is known as the Industrial Health Conference.

The Occupational Health Institute, Inc., is a nonprofit educational organization created by the Industrial Medical Association to promote the cause of health in industry. Since 1951, the Occupational Health Institute has conducted the program of evaluation, approval and certification of Medical Services in Industry, on the basis of standards established by the Standards Committee of the Industrial Medical Association. This program was conducted by the American College of Surgeons for many years until its transfer to the Association.

The Association's headquarters office serves as a focal point for the Association's activities, and through its coordination of information regarding industrial health problems encountered throughout the country, it offers invaluable assistance to members on a host of specific subjects.

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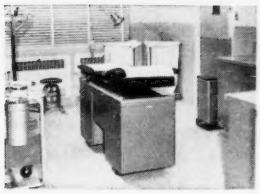

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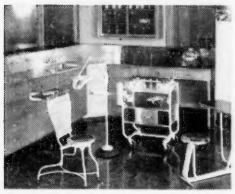

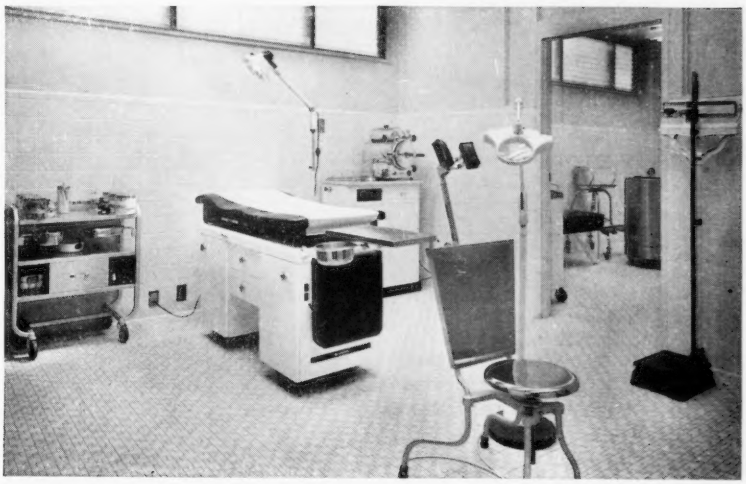

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An important function of the District Counselor is to serve in a liaison capacity with the Component Society of the Industrial Medical Association in his area. The District Counselor also is concerned with regional trends in industrial medical practice and in legislation bearing upon medical service in industry. He is ready to assist any physician with questions or problems.

In promoting the cause of industrial medicine, many District Counselors work with the industrial health committees of their state medical societies, they participate in teaching programs at hospitals or medical schools, and serve as speakers at meetings of groups that express interest in occupational health. Throughout these activities, the District Counselor attempts to stimulate membership in the Industrial Medical Association by acquainting others with the organization's purposes and facilities.

By keeping in close contact with members in his area, the District Counselor gains a familiarity with their work which enables him to make recommendations to the Association's officers and committees regarding those qualified for various positions or honors. He recommends members for committee work, and for fellowship, and recommends fellows for consideration for elective offices in the Association. He also recommends possible recipients for the awards presented at the annual meeting of the Association—the Knudsen Award, the Health Achievement in Industry Award, the Meritorious Service Award and the Merit in Authorship Award.

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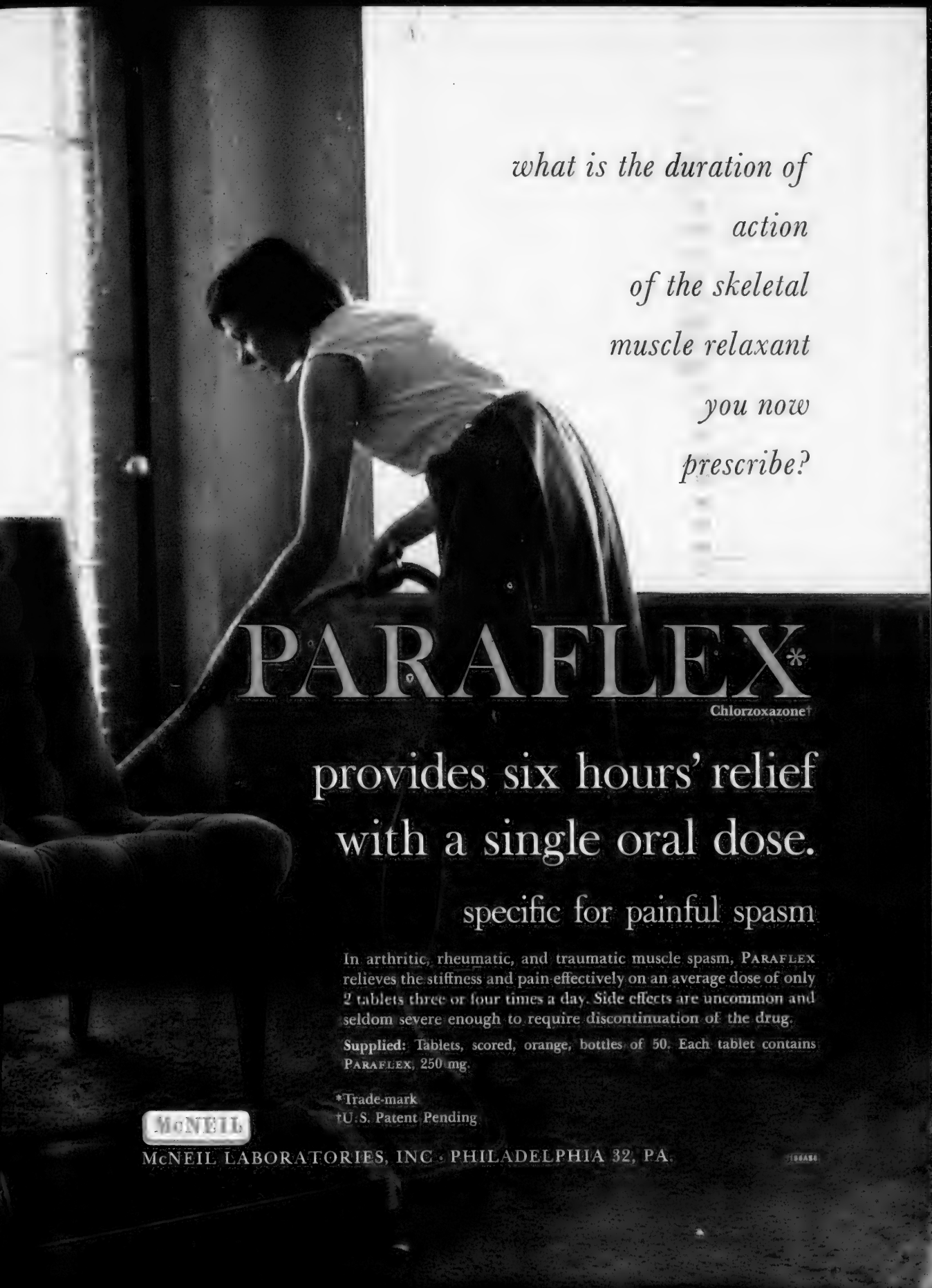

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Officers and Directors Nominated; To Be Voted Upon at Annual Business Meeting

As provided in the By-Laws of the Industrial Medical Association, The Board of Directors has nominated one candidate for each association office. D. JOHN LAUER, M.D., President-Elect, will automatically become President at the conclusion of the Annual Meeting in April at Chicago. Nominees for the other offices, whose pictures appear on the following page, are: R. E. ECKARDT, M.D., for President-Elect; GRADIE R. ROWNTREE, M.D., for First Vice President; H. GLENN GARDINER, M.D., for Second Vice President; LEONARD ARLING, M.D., for Secretary; JOHN L. NORRIS, M.D., for Treasurer.

Eleven candidates have been reported by the nominating committee for vacancies on the Board of Directors for the term, 1959-1962. Five are to be elected at the Annual Business Meeting on April 29. Names of the 11 nominees will appear on the prepared ballot which will be distributed at the door; further nominations, however, may be made from the floor, and names may be written in on the ballot.

Pictures of all nominees named by the Nominating Committee appear on page *16a*. Brief biographical information about each follows:

EDWIN DEJONGH—Medical Director, Pontiac Motor Division, General Motors Corporation, Pontiac, Michigan; M.D., University of Michigan, 1936; IMA Member, 1942, and Fellow, 1943; IMA District Counselor, 1952-53, and Director, 1953-55; Secretary-Treasurer, Michigan IMA, 1952-53; Diplomate, American Board of Preventive Medicine in the specialty of Occupational Medicine.

JAMES P. HUGHES—Medical Director, Kaiser Aluminum & Chemical Corporation, Oakland, California; M.D., University of Pittsburgh, 1945; IMA Member, 1953, and Fellow, 1956; Chairman, IMA Committee on Standards, 1954-59.

WILLIAM L. MACON, JR.—St. Louis, Missouri; M.D., University of Tennessee, 1929; General and Traumatic Surgery, McDonnell Aircraft Corporation and others; IMA Member, 1943, and Fellow, 1956; Counselor, IMA District 18; Fellow, American College of Surgeons and International College of Surgeons.

O. TOD MALLERY, JR.—Medical Director, Employers Mutuals of Wausau, Wausau, Wisconsin; M.D., University of Pennsylvania, 1939; IMA Member, 1951, and Fellow, 1956; Chairman, Health Achievement in Industry Award Committee, 1952-53, 1955-58, and other committee work.

JAMES H. MCDONOUGH—Medical Director, Rome Cable Corporation, Rome, New York; M.D., University of Pennsylvania, 1942; Doctor of Industrial Medicine, Pittsburgh, 1950; IMA Member, 1948, and Fellow, 1956; IMA District Counselor; Diplomate, American Board of Preventive Medicine in the specialty of Occupational Medicine.

LOGAN T. ROBERTSON—Asheville, North Carolina; Consultant, Occupational Health; M.D., University of Cincinnati, 1942; IMA Member, 1952, and Fellow, 1958; IMA District Counselor; Chairman, Small Plant Services Committee and special Membership Drive Committee.

RICHARD C. SWAN—Medical Director, Delco Remy Division, General Motors Corporation, Anderson, Indiana; M.D., Indiana University, 1937; IMA Member, 1949, and Fellow, 1953; Board of Governors, Central States Society of Industrial Medicine and Surgery, 1958-60; Diplomate, American Board of Preventive Medicine in the specialty of Occupational Medicine.

ROBERT C. THOMPSON—Manager, Health and Hygiene, General Electric Company, West Lynn, Massachusetts; M.D., Syracuse University, 1942; IMA Member, 1949, and Fellow, 1955; Past President, New England IMA; IMA District Counselor.

EARL E. WESTON—Detroit, Michigan; Medical Director various companies; M.D., University of Michigan, 1936; IMA Member, 1942, and Fellow, 1950; Past President, Michigan IMA.

L. HOLLAND WHITNEY—Medical Director, American Telephone & Telegraph Company, New York City; M.D., Syracuse University, 1928; IMA Member, 1943, Fellow, 1949, and Director 1952-54; Past President, IMA of New Jersey; present member Executive Committee, New York State Society of Industrial Medicine; Diplomate, American Board of Preventive Medicine in Occupational Medicine.

ROBERT A. WISE—Assistant Chief Physician, Humble Oil & Refining Company, Houston, Texas; M.D., Washington University, St. Louis, 1936; IMA Member, 1953, and Fellow, 1957; IMA District Counselor; Secretary-Treasurer, Texas IMA; Fellow, American College of Physicians; American Board of Internal Medicine.

RESERVATIONS FOR ANNUAL BANQUET

The IMA annual banquet will be held in the Grand Ballroom of the Sherman Hotel in Chicago at 7 P.M. on April 29, 1959. Advance reservations will be accepted until April 15, according to ROLAND A. JACOBSON, M.D., Banquet Committee Chairman. Each table will seat eight persons and the cost is $10.00 per ticket. Reservations, specifying table desired (see floor plan on page *17a*), should be sent to the Industrial Medical Association, 28 E. Jackson, Chicago 4, and should be accompanied by remittance. Places will be assigned in order of receipt of applications. Tickets may also be purchased at the registration desk at the Sherman Hotel from Monday, April 27 to Wednesday noon, April 29.

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Gradie R. Rowntree, M.D.
Nominee for First Vice President

H. Glenn Gardiner, M.D.
Nominee for Second Vice President

Leonard Arling, M.D.
Nominee for Secretary

John L. Norris, M.D.
Nominee for Treasurer

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(Five to be Elected)

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William L. Macon, Sr., M.D.

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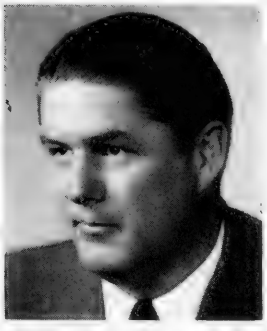
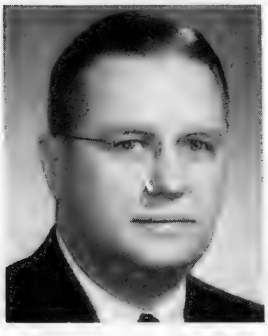


Logan T. Robertson, M.D.



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Robert C. Thompson, M.D.

Earl E. Weston, M.D.

L. Holland Whitney, M.D.

Robert A. Wise, M.D.

Association Activities

Proposed Changes in By-Laws To Be Presented to Membership at Annual Business Meeting

The By-Laws Committee of the Industrial Medical Association recommends the following changes to the By-Laws, which are to be voted upon by the membership at the Annual Business Meeting in Chicago on April 29, 1959. The By-Laws Committee includes H. Glenn Gardiner, M.D., Chairman; Duane L. Block, M.D., Emmett B. Lamb, M.D., Arthur K. Peterson, M.D., and George F. Wilkins, M.D.

Fellowship

Article III, Section 2 (b) now reads: "Fellowship may be conferred by the Board of Directors upon those active members who have been properly indorsed by the Counselor and/or the president of the component society, and approved by the Board of Examiners."

Proposed change: "Fellowship may be conferred by the Board of Directors upon those active members who have been properly indorsed by the Counselor and/or the president of the component society and/or a member of the Board of Directors."

This change gives Directors, as well as Counselors and presidents of the component societies, the privilege of indorsing a candidate for Fellowship, and further, it removes the necessity of approval by the Board of Examiners.

Article III, Section 2 (c) now reads: "The Board of Examiners shall consist of three (3) Fellows appointed by the President with the approval of the Board of Directors. The term of office of the Examiners shall be for a period of three (3) years with one (1) new appointee each year."

Proposed change: "The Board of Examiners shall consist of three (3) Fellows appointed by the President with the approval of the Board of Directors. The term of office of the Examiners shall be for a period of three (3) years with one (1) new appointee each year. The Board of Examiners shall evaluate the qualifications of active members proposed for Fellowship and make appropriate recommendations to the Board of Directors."

This change defines the duties of the Board of Examiners.

Honorary Membership

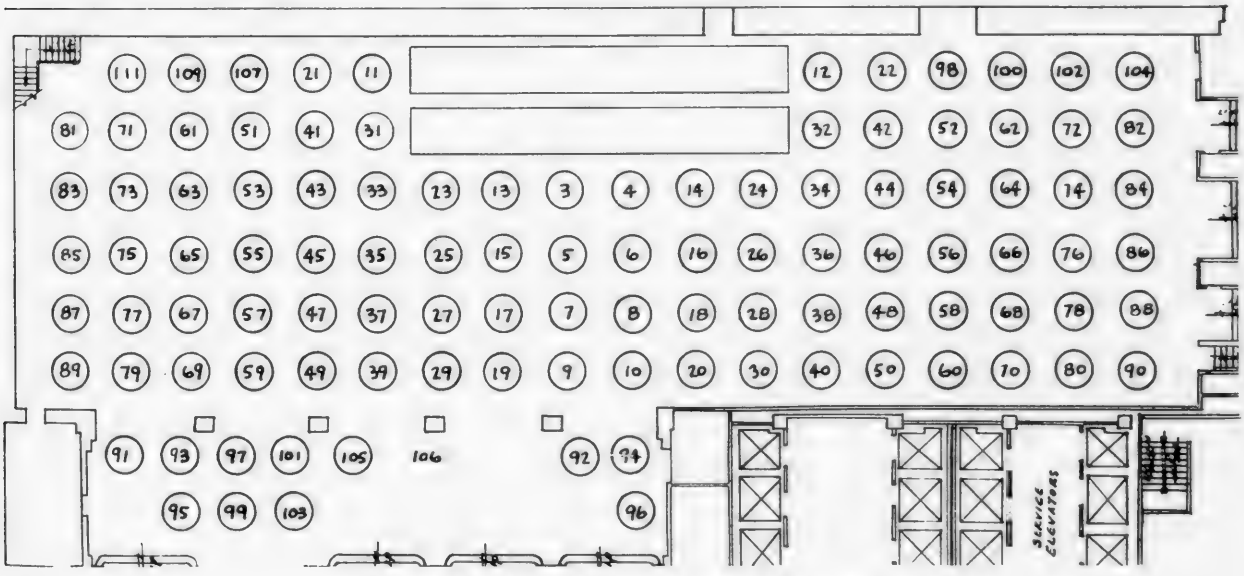
Article III, Section 5 now reads: "Honorary Membership shall be conferred upon physicians and surgeons who have contributed distinguished service to the objectives for which the Association stands, or have performed some special service for the Association."

Proposed change: "Honorary Membership shall be conferred upon those individuals not members or Fellows of the Association who have contributed distinguished service to the objectives for which the Association stands, or have performed some special service for the Association."

This change removes the restriction that an honorary member must be a physician or surgeon. This change also makes active members and Fellows ineligible for change to such status.

Officers and Directors

Article IV, Section 1 now reads: "The Officers of the Association shall be a President, a



Grand Ballroom, Sherman Hotel, Chicago

Site of IMA Annual Banquet, April 29. **(Story on page 14a.)**

President-Elect, a First Vice-President, a Second Vice-President, a Secretary, a Treasurer and a Managing Director. The President shall hold no other office in this Association."

Proposed change: "The Officers of the Association shall be a President, a President-Elect, a First Vice-President, a Second Vice-President, a Secretary, and a Treasurer. The President shall hold no other office in this Association."

This change removes the position of Managing Director from the category of elected officers.

Meetings of Members

Article VI, Section 5 now reads: "The vote of a majority of the Members present in person or represented by proxy, having a right to vote, shall decide any question brought before such meeting, unless the question is one upon which by express provision of the statutes or of the Certificate of Incorporation or of these By-Laws, different vote is required, in which case such express provision shall govern and control the decision of such question."

Proposed change: "The vote of a majority of the Members present in person or represented by proxy, having a right to vote, shall decide any question brought before such meeting, unless the question is one upon which by express provision of the statutes or of the Certificate of Incorporation or of these By-Laws, a different vote is required, in which case such express provision shall govern and control the decision of such question. Exception to the above provision for a majority vote will occur in the election of contested offices in which the successful candidate will be declared elected on the basis of a plurality vote by those members casting ballots."

This change provides for the election of officers by the majority of those members in attendance at the meeting and casting ballots, rather than a majority of the entire membership.

Election of Officers and Directors

Article VIII, Section 1 now reads: "Within sixty (60) days following the annual business meeting of the Members, the President shall appoint a Nominating Committee consisting of three (3) Fellows from the Membership at large and three (3) Presidents of Component Societies. The Nominating Committee shall nominate not less than two (2) Fellows for each vacancy on the Board of Directors—five (5) of whom shall be for a term of three (3) years, and shall also make nominations for any vacancies for unexpired terms which may need to be filled.

Proposed change: The words "annual business meeting" be changed to "annual meeting."

Article VIII, Section 8 now reads: "The Election will be conducted by the President according to accepted parliamentary practices. The results will be announced before the close of the business meeting."

Proposed change: "The Election will be conducted by the President according to accepted parliamentary practices. The President will not cast a ballot except in case of a tie vote for any office or offices. The results will be announced before the close of the annual meeting."

This change stipulates that the President refrain from voting for officers except in case of a tie.

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	2:00 P.M.	Tour of Tribune Building and Tower
Tuesday	8:30 A.M.	Continental Breakfast
	9:30 A.M.	Meeting in Hospitality Room
	12:30 P.M.	Luncheon at Art Institute
	2:00 P.M.	Tour of Contemporary Exhibit
Wednesday	12:00 noon	Presidents' Wives Luncheon at the Kungsholm Restaurant
	2:00 P.M.	Puppet Opera "Madame Butterfly"
Thursday	12:30 P.M.	Luncheon and tour of the Merchandise Mart

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Journal of Occupational Medicine

Fifteen Years of Cardiac Work Classification

Leonard J. Goldwater, M.D., and
Lewis H. Bronstein, M.D., New York City

IN 1941 the first Work Classification Unit for cardiacs was established at Bellevue Hospital in New York. Its main objectives were (1) to provide a service that would be helpful in solving employment problems of cardiacs; (2) to study the effects of employment on the course of heart disease; (3) to study the effects of heart disease on capacity for work; and (4) to serve as a demonstration and teaching center. At the time of its inception the Unit envisaged a 20-year program as necessary if the objectives were to be achieved.

The Bellevue Unit voluntarily suspended operations in June, 1956, after 15 years of activity. This step was taken because of a feeling that the stipulated goals had been reached. While the program had many shortcomings throughout its life, it nevertheless had attained a measure of success: Several hundred cardiacs had been helped to find or retain employment; and substantial information on the interrelationships between employment and heart disease had been collected. During the period starting in 1950, approximately 50 similar programs were initiated in various parts of the country, many of these by physicians who had been trained at or assisted by the Bellevue group. These accomplishments can be viewed with pardonable pride.

Between 1944 and 1953 about a dozen articles were published by members of the Bellevue Work Classification Unit staff. The references are listed in a paper[1] which appeared in 1956. None of these early reports dealt with the case material which is discussed in the present article. At the First Wisconsin Conference on Work and the Heart, one of us (L.H.B.) gave a preliminary summary of some of the findings of the 15-year study. This will be published in the Proceedings of the Wisconsin Conference. Some of the tables which appear below are similar to those presented at the Conference.

Characteristics of the Patients

Source of Referral—It is apparent from Table I that about two-thirds of the 952 patients referred to the Unit came from the New York State Employment Service. The large proportion is readily explained by the fact that this agency had been instrumental in stimulating the establishment of the Work Classification Unit and was given priority in the acceptance of patients. The principal criterion for admission was the existence of an employment problem related to heart disease.

Because of the fact that the Unit was experimental, no effort was made to stimulate large numbers of referrals. As a matter of fact, the number of new cases accepted was strictly limited. In order to diversify the experience, however, a number of patients were accepted from

From the Adult Cardiac Clinic, Third (New York University) Medical Division, Bellevue Hospital, and the Division of Occupational Medicine, School of Public Health and Administrative Medicine, Columbia University.

This paper was presented at a meeting of the Industrial Medical Association, Atlantic City, N. J., April 22, 1958.

Table I—Referral Sources

Source	No.	Percent*
New York State Employment Service	614	65
Division of Vocational Rehabilitation	116	12
Social agency†	103	11
Employer	97	10
Other‡	22	2
Total	952	100

*Percentages are rounded.
†Includes hospitals, clinics, welfare agencies, and New York Heart Association.
‡Includes self and private physicians.

other sources. These are shown in Table I.

Age, Sex and Race—The figures for age, sex, and race are given in Table II. It is apparent from this table that all age groups were represented in substantial proportions, with no great preponderance in the young, middle-aged, or elderly. The nonwhites were somewhat younger than the whites, with only 3% of the nonwhites in the age group of 55 and over.

The proportion of whites to nonwhites in the entire group, 84% to 16%, is not that of the general population of New York City. The latter is about 90% white and 10% nonwhite. This discrepancy is difficult to interpret but may possibly be a reflection of greater difficulty experienced by nonwhites in securing employment, of a higher prevalence of heart disease among nonwhites, or simply of the racial distribution of applicants for employment registered with the State Employment Service. A more detailed study of these possibilities will be made at a future time. The disproportionate number of males and females also calls for further analysis, which will be done at a future time.

Occupation and Employment Status—The figures given in Table III show that of the 952 patients seen at the Unit more than half fell into the categories of semiskilled and unskilled workers. An additional third were classified as clerical, sales, and skilled workers. The significance of these figures lies principally in their demonstrating that the patients who came had a great variety of occupational backgrounds and did not represent a group whose employment problems are solved with unusual ease.

Because the major source of referral was the State Employment Service, it is not surprising that 80% of the patients were unemployed when first seen. The unemployed status was

Table II—Age, Sex, and Race of Patients

			Sex*				Race†			
	All Cases		Male		Female		White		Nonwhite	
Age	No.	%	No.	%	No.	%	No.	%	No.	%
Under 25	216	23	176	22	40	25	166	21	50	32
25-34	213	22	174	22	39	24	165	21	48	31
35-44	162	17	129	16	33	21	134	17	28	18
45-54	188	20	158	20	30	19	164	20	24	16
55 and over	173	18	156	20	17	11	169	21	4	3
Total	952	100	793	100	159	100	798	100	154	100

*Of total patients, 83% were male. †Of total patients, 84% were white.

Table III—Occupational Classification and Employment Status, All Cases

			Admission Status			
	All Cases		Unemployed		Employed	
Occupational Class	No.	%	No.	%	No.	%
Professional	5	(1)	3	60	2	40
Technical and administrative	36	4	11	31	25	69
Clerical, sales, and skilled	328	34	236	72	92	28
Semiskilled	278	29	243	87	35	13
Unskilled	248	26	221	89	27	11
Students	13	1	....	0	13	100
No work history	44	5	44	100	....	0
Total	952	100	758	80	194	20

found most frequently in the unskilled and semiskilled workers.

Presence of Heart Disease—All patients referred to the Unit had been presumed to have heart disease. It soon became apparent, however, that this presumption was incorrect in a considerable number of cases. Table Four shows that 231 (24%) of the 952 patients did not have heart disease. A detailed analysis of some of these cases was published in 1952 in an article entitled "A Study of 175 'Cardiacs' without Heart Disease."[2] Other work classification units have encountered similar percentages of noncardiacs. The collective experience strongly suggests that a substantial number of individuals in the population who believe they have heart disease are in fact suffering from other illnesses or have no organic disease at all. Thus the establishment of an accurate diagnosis emerges as an important contribution of a cardiac work classification unit. This may be looked upon as a valuable by-product. The noncardiacs will receive no further consideration in this paper.

Type and Severity of Heart Disease—In addition to the 231 patients with no heart disease, there were 78 who failed to complete the standard work-up at the unit. This leaves a total of 643 cases of heart disease for further analysis. The numbers in each etiological category and in the various functional and therapeutic classes is shown in Table V. The cases diagnosed in Possible and Potential Heart Disease are included, since such cases are considered to be cardiac according to the criteria of the New York Heart Association.[3] The terminology applied to this type of patient officially changed in 1953, but there was no cogent reason to make the necessary changes in the records of the Unit. The old terminology has been retained at the risk of criticism from the purists.

The salient feature of Section A of Table V is that rheumatic heart disease comprised the largest group (33% of the cases) and arteriosclerotic heart disease was second in importance (23%). The most significant point shown in Section B of Table V is that 56% of the patients had a functional and therapeutic classification of IIB or worse. This means that a majority had moderately or far advanced heart disease. It is true that the possible and potential group was fairly large, but it embraced less than one-fifth of the series.

Observations on Employment and Cardiac Status

Employment Status of the Cardiacs—It can be seen in Table VI that the proportion of employed and unemployed cardiacs at the time of admission was the same as for the entire series,

Table IV—Presence of Heart Disease by Referral Source

	All Cases		N.Y.S.E.S.		D.V.R.		Social Agency		Employer		Other	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Heart disease	643	68	377	62	93	80	91	88	67	69	15	68
No heart disease	231	24	173	28	21	18	4	4	29	30	4	18
Incomplete work-up	78	8	64	10	2	2	8	8	1	1	3	14
Total	952	100	614	100	116	100	103	100	97	100	22	100

Table V—Type and Severity of Heart Disease

A			B		
Etiological Diagnosis	No.	%	Functional and Therapeutic Class	No.	%
Congenital	27	4	I A	38	6
Rheumatic	211	33	I B	120	18
Hypertensive	45	7	II B	158	24
Arteriosclerotic	151	23	II C	144	22
Hy. and art.	69	11	III C	62	10
Syphilitic and unknown	23	4	IV	4	(1)
Poss. and pot.	117	18	Poss. and pot.	117	19
Total	643	100	Total	643	100

namely 20% employed and 80 unemployed. After one year of follow-up, 39% were known to be employed full time and an additional 9% part time. Thus nearly half were known to have some degree of employment, while 19% were known to be unemployed. Unfortunately, there were 173 patients, or 27% of the cardiacs, who were not seen at the end of the first year following their initial visit. Many of these, however, subsequently returned for follow-up. This attrition, which continued during subsequent years, detracts greatly from the value of these studies.

Table VI—Employment Status of Cardiacs on Admission and at One Year Follow-Up

	On Admission		One Year Later	
Status	No.	%	No.	%
Unemployed	512	80	124	19
Employed				
Full time	131	20	251	39
Part time	....	....	59	9
Out of labor market	....	...	16	3
Dead	....	....	20	3
Unknown	....	....	173	27
Total	643	100	643	100

Table VII—Employment Status of Cardiacs by Years of Follow-Up

Years Following Admission	Number of Cases Followed	Employment Status* Employed		Unemployed		Unknown†	
		No.	%	No.	%	No.	%
0	643	131	20	512	80	....	....
1	515	310	60	124	24	61	16
2	400	225	56	76	19	99	25
3	324	183	57	60	19	81	24
4	259	142	55	40	15	77	30
5	196	113	58	33	17	50	25
6	138	84	61	25	18	29	21
7	86	57	66	13	15	16	19
8	54	38	70	7	13	9	17
9	34	24	70	5	15	5	15
10	23	13	57	4	17	6	26
11	18	11	61	1	(5)	6	34
12	14	10	72	1	(7)	3	21
13	11	10	91	....	....	1	(9)
14	5	5	100	....	....	....	....

*Information based on return to observation after a lapse of one or more years in some cases.
†Includes those out of labor market.

Subsequent Employment Status—Difficulties in long-range follow-up are encountered in all studies which involve attempts to keep patients under observation for long periods of time. The present study is no exception to this rule. Table VII shows the number of cardiacs followed by years of follow-up. The longest period was 14 years, and only five cases fell into this group. There were 23 that were followed for 10 years, 196 for five years, 400 for two years and 515 for one year. A majority of those who remained under observation were employed for all or most of the period.

Subsequent Cardiac Status—The effects of employment on the course of heart disease after a period of one year is shown in Table VIII. Of those who were employed full time, 78% showed no appreciable change, 12% improved and 10% were worse. When these figures are compared with those for patients who were unemployed at the end of the first year it is seen that of the latter group, 62% were unchanged, 27% were worse and 11% improved. These observations support a conclusion, previously reported,[4] that employment *per se* does not appear to have an adverse effect on the course of heart disease. Long range follow-up, as shown in Table IX, lends additional confirmation. The fact that cardiac status might deteriorate after 10 or 15 years cannot necessarily be attributed to employment.

Comment and Conclusions

The present report is not intended to represent a detailed analysis but rather to present a brief account of some of the major points observed in this 15-year study. Further analyses will be made and reported in the future.

It is obvious, and has already been mentioned, that the large number of cases lost to follow-up detracts greatly from the value of these observations. This point is emphasized for two major reasons: first, to caution any

*Table VIII—Cardiac Status in Relation to Employment after One Year**

Cardiac Status	Employed		Employed Part Time		Unemployed	
	No.	%	No.	%	No.	%
Worse	20	10	8	17	28	27
Same	159	78	36	75	65	62
Improved	24	12	4	8	12	11
Total	203	100	48	100	105	100

*This table includes only those whose cardiac and employment status were both known on the first anniversary of contact with the Work Classification Unit.

enthusiasts against drawing unwarranted conclusions and, second, to point out to others who are engaged in this type of work the importance of setting up an effective follow-up system at the outset.

Among the many cardiac work classification units now functioning there are no two which are exactly alike. Variations are found in sources of referral, admission policies, age, sex, race, employment status, and other characteristics. Because of these differences great care must be taken if any comparisons among units are to be made. The success or failure of each unit must be judged on its own performance and not by comparing the experience of one unit with that of another. The Bellevue Unit is felt to have been successful, not so much because it was instrumental in solving the employment problems of a number of cardiacs, but, rather, because it accomplished the objectives for which it was organized.

The data presented in this brief article would appear to justify the following conclusions:

1. A cardiac work classification unit can perform a valuable function in assisting cardiacs to find and retain suitable employment.

2. A work classification unit which has a good follow-up program can be a source of important information on the effects of employment on the course of heart disease. The value of the observations will be in direct proportion to the completeness and duration of follow-up.

3. The diagnostic procedures performed at a cardiac work classification unit may reveal that many persons believed to be cardiac do not have heart disease. Similar procedures can, of course, be carried out elsewhere.

4. Observations made over a span of 15 years have not produced any evidence that employment *per se* has any adverse effect on the course of heart disease.

Acknowledgments

It is not possible to extend individual recognition to each of the dozens of dedicated physicians and auxiliary workers who contributed to these studies. They served faithfully and often at great personal sacrifice, with no thought of gain or glory. This paper would not be complete if it did not acknowledge the contributions of all who had a part in the program.

Dr. Goldwater's address is 600 W. 168th St., New York 32.

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Table IX—Cardiac Status in Relation to Employment Status by Years of Follow-Up

Anniversary Year Following Admission	Employed						Unemployed					
	Cardiac Status						Cardiac Status					
	Worse		Same		Improved		Worse		Same		Improved	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	28	11	195	78	28	11	28	27	65	62	12	11
2	31	18	120	70	21	12	16	25	42	67	5	8
3	19	15	80	65	25	20	15	34	25	57	4	9
4	22	23	54	56	20	21	12	34	15	43	8	23
5	16	20	50	60	16	20	6	27	9	41	7	32
6	12	21	27	49	17	30	5	28	7	39	6	33
7	4	9	27	61	13	30	4	31	4	31	5	38
8	5	17	16	55	8	28	....	....	2	(50)	2	(50)
9	4	21	11	58	4	21	....	....	4	(80)	1	(20)
10	2	18	5	46	4	36	1	(33)	2	(67)	....	....
11	2	22	4	45	3	33	....	....	....	....	....	....
12	2	(33)	1	(17)	3	(50)	1	(100)	....	....	....	....
13	1	(14)	3	(43)	3	(43)	....	....	....	....	....	....
14	3	100	....	....	....	....	....	....	....	....	....	....

Severity of Myocardial Infarction in Garment Workers

Leo Price, M.D., New York City

CORONARY artery disease primarily affects older people, and this condition is fairly common among patients attending the New York Union Health Center of the International Ladies' Garment Workers' Union. It was found that in many of the patients studied this condition, whether mild or severe, was compatible with a long working life and favorable life expectancy.

About 147,000 workers in the garment industry in New York City are eligible to receive prepaid medical service at this institution. In addition, 13,000 retired union members are also eligible for service. More than 36,000 patients* (57% women, 43% men) attend the Center annually and receive about 575,000 services. The Center treats older persons for the most part: 89% of its patients are more than 40 years of age and half are aged 60 or older. In the over-60 age group attending the Center men patients outnumber the women. In the younger age groups there are more than twice as many women patients as men.

Continued observation over a long period of years of a population which has been receiving constant ambulatory medical supervision has uncovered the existence of a variety of "coronaries" which are not generally seen in hospital cases, from which the prevailing concept of the seriousness of the disease has been developed.

Methodology

From the annual average of 15,000 electrocardiograms made for about 13,000 individual patients, all patients whose electrocardiograms showed evidence of myocardial infarction were selected for study.† During the past three years (up to May 30, 1958) 1,522 cases of myocardial infarction were listed and used as the source of the present study.

The cardiology follow-up department was notified whenever a patient with healed myocardial infarction was scheduled to appear at the clinic. Each patient was examined by a cardiologist after being interviewed by a nurse or a member of the follow-up staff. In most instances the patient had been previously examined on many occasions, usually over a long period of years. Many electrocardiograms and reports of examinations in general medicine and the various specialties were included in the clinical records. Consequently the medical records were quite complete. Supplementary medical information was provided by hospitals or by private physicians concerning treatment for cardiac or other conditions at home or in the hospital.

No effort was made to contact patients if they did not appear of their own volition. Therefore the health status of those who did not chance to visit the Center during the period

Dr. Price is Director, Union Health Center, International Ladies' Garment Workers' Union.

*Workers receiving only certification of illness for disability insurance benefits are not counted among patients.

†The criteria used in the interpretations of the electrocardiograms were those of "Nomenclature and Criteria for Diagnosis of Diseases of the Heart and Blood Vessels" of the American Heart Association (New York, 1953). All tracings were interpreted by the late Dr. Marcel Goldenberg, of New York Presbyterian Hospital, who eliminated cases which did not meet the standard requirements. In the Center an electrocardiogram is ordered for every patient over 40 years of age. Seven leads were taken routinely: the three standard limb leads, lead aV_F, and the chest leads V_2, V_3 and V_5. Twelve leads were taken only when it was considered essential for diagnosis. Each patient included in the study was clinically evaluated by the chief cardiologist of the Center, Dr. Alexander Oscharoff, also of Queens General Hospital, who coordinated the history, physical findings, and laboratory and electrocardiographic results in every case.

of the study is unknown. They may be enjoying relatively good health; they may have had another attack; or they may have left the industry.

In the manner described, 414 patients were examined and data collected at some time during the period of the study. The data were confined to information about the first myocardial infarction. Thirty-two patients in the study had experienced more than one attack; thirty had two and two patients had three attacks.

Age

Although there is much concern over the increasing incidence of coronary disease in persons under 50 years of age, the condition is more frequently encountered in older subjects. This study emphasizes the importance of considering age, since 88% of the patients studied have passed their 60th birthday. These figures are weighted because only 10% of the 414 patients are women.

The preponderance of myocardial infarction cases among males in this study is due to the fact that men remain longer in the industry and therefore a greater number of them reach an age at which myocardial infarction is likely to occur. On the other hand, women in this industry stop work at an earlier age than men, and fewer continue in employment until the retirement age.

Workers in this industry are eligible for pensions after they reach their 65th year. Those over 60 years of age may apply for early retirement if they are found to be totally and permanently disabled. Many workers do not retire at age 65 because they prefer, or need, to continue work, while others continue in order to satisfy eligibility requirements for pension rights, or because pension funds are, unfortunately, not available when they apply for retirement.

The following three tables are concerned with the ages of patients who had myocardial infarction and the period of survival.

Table I shows that 364 of the patients studied, or 88%, are over 60 years of age; 180, or 43%, are still in the work force, and 234, or 57%, are now retired.

Table II shows that 67% of the 414 garment workers studied had myocardial infarction when they were 60 years of age or older. Of the patients, 61 had the attack after their retirement; 353 (85%) were actively employed at the time of the attack. Subsequently 173 of these 353 retired. Note that among the patients who continued in employment past the retirement age of 65 years 23 are now in their seventies and 80 are between 65 and 69.

Table I—Present Age of Patients and Present Status in the Work Force

	All Patients		In Work Force		Retired	
Age	No.	%	No.	%	No.	%
40-49	4	1	4	2	....	....
50-54	13	3	13	7	....	....
55-59	33	8	33	18	....	....
60-64	77	19	65	36	12	5
65-69	137	33	47	26	90	39
70-79	143	34	17	10	126	54
80+	7	2	1	1	6	2
Total	414	100	180	100	234	100

Table II—Age Distribution of Active and Retired Workers with Myocardial Infarction

Age at Which First Infarction Occurred	Active Workers		Retired Workers		Total	
	No.	%	No.	%	No.	%
40-49	22	6	....	....	22	5
50-54	39	11	....	....	39	9
55-59	78	22	....	....	78	19
60-64	109	31	2	3	111	27
65-69	80	23	21	35	101	24
70-79	23	6	34	56	57	14
80+	....	....	3	5	3	1
Age Unknown	2	1	1	1	3	1
Total	353	100	61	100	414	100

Table III—Age and Survival of Workers with Myocardial Infarction

Age at Infarction	Period of Survival, Years					Total	
	3 or less	4-6	7-9	10+	Unknown	No.	%
40-49	4	....	4	14	....	22	5
50-54	11	8	9	11	....	39	9
55-59	33	14	16	15	....	78	19
60-64	42	27	31	11	....	111	27
65-69	68	19	7	7	....	101	24
70-79	44	9	2	1	1	57	14
80+	3	....	....	....	....	3	1
Unknown	1	....	....	....	2	3	1
Total	206	77	69	59	3	414	100

In Table III it will be seen that at the time of the last physical examination 128, or 31%, of the 414 patients had experienced their attack seven or more years before, while 59 had had their initial attack 10 or more years before. Of the latter 22 are still working and 37 are retired. Two patients in whom well-documented attacks occurred 25 and 27 years ago, when they were 48 and 49 years old, are still working.

Among the retired workers, the initial attack occurred less than 16 years ago in 25, from 16 to 20 years ago in 8, and 4 had the attack more than 20 years ago.

Table IV describes 19 patients in this study who died during the last 15 months of the study period: 15 in 1957 and 4 in the first quarter of 1958. Among the patients in the work force at the time of death, one had continued employment for 10 years after myocardial infarction, one had worked for 7 years following the attack, and four others had worked from 3 to 6 years. Among the retired patients, one had remained in the work force for 21 years after myocardial infarction and survived the attack 26 years, to die at the age of 79. Three retired workers in their seventies had left the work force immediately after the infarction; two survived only two years, and lived three years. The longest period of survival after retirement was five years.

Table IV—Period of Survival of Nineteen Patients Who Died Since Study Began

Age at Time of First Myocardial Infarction	Duration of Employment After Infarction	Age at Time of Death
Died after retirement		
53	21	79
76	0	78
75	0	77
70	0	73
70	1	72
63	7	71
62	7	70
68	0	70
66	0.5	68
49	16	67
65	2	67
64	1	66
Died while employed		
64	7	71
65	1	66
55	10	65
58	3	61
57	3	60
57	3	60
53	6	59

Severity

It is the customary assumption that people who have myocardial infarctions should suspend all activity and secure medical care. Our study shows that while 70% of the patients in this series stopped work and secured medical care, nevertheless 30%, not being aware of having had an attack, had no period of disability and of course no medical care.

The heart attacks were labeled mild, moderate, or severe according to the record of the course of the illness, the history of the symptoms, and the electrocardiographic findings.

Determining the severity of each attack, even with the greatest care, is difficult because of the lack of a good yardstick. The characteristic retrosternal pain, an important symptom on which to gauge severity, is necessarily subjective. Different persons have different pain thresholds, and some measure pain as a sign of the seriousness of the disease more than others.

The staff involved in the study—the medical recorder, nurses, and physicians—are well acquainted with the patients who have been attending the clinic regularly for years. The data which they gather from each patient were reviewed by the chief cardiologist, who then graded the attack.

When the coronary attack is described as beginning with a severe, crushing chest pain, with radiation to the left arm, hand, and fingers, breathlessness, vomiting, nausea, collapse, and shock, grading it as a severe episode is relatively simple. On the other hand, there were episodes in which patients were aware of a heart attack accompanied by some retrosternal pain, weakness, breathlessness, and other conditions which prompted the patient to seek medical care. These could be described as mild attacks. The moderately severe category was located somewhere between the mild and severe attacks.

There were 123 patients (30%) who were totally unaware that they had had a heart attack. They comprise two groups: 28 who were symptomless, and 95 who described symptoms such as a cold, indigestion, fever, feeling of malaise, and even at times chest pains they did not relate to a heart attack. In these 123 patients, myocardial infarction was discovered by routine electrocardiography on older patients.

The benign nature of such attacks apparently permits patients to go about their regular activities without the usual disabling discomfort and shock of the conventionally described "heart attack." It seems that either such an infarction is influenced by good coronary col-

Table V—Severity of Attack Related to Presence of Disability

Severity	Disability Period: Absent	Present	Total
Patients unaware of attack	103	20	123 (30%)
Patients aware of attack			
Mild	7	18	25
Moderate	17	107	124
Severe	3	96	99
Severity Unknown	5	38	43
Total	135 (32%)	279	414

lateral circulation, and may involve only a small area of the heart muscle, or that the infarction develops slowly and therefore ischemia is insufficient to evoke sudden severe pain.

These 123 cases were all diagnosed at the Center. Seven of the infarctions were in the acute stage, estimated to have occurred less than eight weeks prior to the time the electrocardiogram was taken. The balance were in either the healing or the healed stages at the time of discovery.

Disability

The term "disability" refers to time spent in bed rest or in restricted activity advised by a physician. The disability period is influenced not only by the physical and emotional state of the patient but also by his disability insurance coverage and whether or not he has work available to him. In the garment industry factors which foster a worker's desire not to lose time from work are the piecework basis of earnings and the limited seasonal working periods.

From Table V it can be seen that among the 414 patients studied 279 had varying periods of disability. Twenty patients who were disabled were unaware of having had a heart attack, but when so informed they accepted medical advice to submit to treatment. One of these patients was off work for one year after she learned she had had an infarction, because she was frightened.

Of the 135 patients (32%) who had no disability from the infarction, 103 were unaware of the attack. Of these 103 patients, 29 were already retired from the industry, 3 retired upon being informed that they had had a myocardial infarction, and the remaining 71 lost no time from work. All of these 103 patients with one exception were over 65 years of age.

Thirty-two of the patients who had no disability were aware of the attack but continued their usual activities. Twenty of the thirty-two kept on working; eight had retired before the infarction, and four retired immediately but remained ambulant. Of the 32 patients who continued normal activities, 7 had mild attacks, 17 had moderate, and 3 had severe attacks. In five patients the severity was unknown.

Table VI—Disability in Relation to Severity

	Total	Unaware	Mild	Moderate	Severe	Severity Unknown
Patients with disability	228	12	16	85	85	30
Patients without disability	135	103	7	17	3	5
Disability unknown	51	8	2	22	11	8
Total	414	123	25	124	99	43

Table VII—Disability Period of 228 Patients in Relation to Severity and Place of Treatment

Disability, Total Weeks	Patients Treated			Unaware		Mild		Moderate		Severe		Severity Unknown	
	Home	Hosp.	Total	Home	Hosp.	Home	Hosp.	Home	Hosp.	Home	Hosp.	Home	Hosp.
Under 3	7	3	10	2	2	1	1	3	....	....	....	1	....
4-6	9	15	24	2	1	1	2	5	2	....	8	1	2
7-9	17	30	47	1	....	2	1	8	7	3	16	3	6
10-13	20	33	53	1	1	1	....	12	12	4	14	2	6
14-26	26	48	74	....	1	1	4	14	14	8	24	3	5
27-39	6	11	17	....	....	1	1	1	7	4	2	....	1
40-52	....	2	2	....	1	....	....	....	....	....	1	....	....
52+	....	1	1	....	....	....	....	....	....	....	1	....	....
Total	85	143	228	6	6	7	9	43	42	19	66	10	20

Table VIII—Median Number of Weeks of Disability According to Severity and Place of Treatment

Weeks of disability	Total		Treated at Home		Treated at Hospital	
	Patients*	Median Weeks	Patients*	Median Weeks	Patients*	Median Weeks
Total	228	12	85	11	143	13
Unaware of attack	12	5	6	5	6	5
Mild	16	9	7	9	9	9
Moderate	85	12	43	11	42	13
Severe	85	13	19	18	66	13
Severity Unknown	30	10	10	8	20	11
Weeks in bed only						
Total	254†	4	89	6	165	4
Unaware of attack	13	3.5	7	3	6	3
Mild	14	3	5	4	9	3
Moderate	100	4	46	5	54	4
Severe	93	6	21	7	72	5
Severity Unknown	34	4	10	4	24	4

*Only patients disabled by myocardial infarction are included.

†The discrepancy between 228 in one section and 254 in the second section refers to 26 patients for whom the total disability period was unavailable, although the number of weeks spent in bed was recorded.

In Tables VI and VII it will be seen that the length of disability was recorded for 228 patients. In 51 instances information was not available about the length of time the patient was disabled, and 135 patients were not disabled at all. Of the 363 patients for whom disability information is available, 85 patients (24%) were treated at home; 143 (39%) were treated in the hospital, and 135 (37%) were ambulant.

In severe cases patients received medical care in the hospital in the proportion of three patients hospitalized to every one treated at home. Among the other grades of severity there was little difference in the place of treatment.

Of the 228 patients for whom there is complete information concerning disability, 181 continued to work after recovery from the infarction; 24 retired after the attack; 23 were already retired.

Table VIII shows that the median period of bed rest ranged from three and one-half to six weeks. The total period of disability varied in direct proportion to the severity of the attack: from 5 weeks to 13 weeks. If we were to include in our computation the 135 patients who made no claims for disability whatever, the median total disability period would decrease from 12 weeks to 7 weeks.

Summary and Conclusions

By means of taking routine periodic electrocardiograms in a large number of over-age garment workers, the diagnosis of myocardial infarction was made in 44 patients. Thirty per cent of those studied, 123 patients, were unaware that they had had a heart attack. Of these, 103 had had no disability. Thirty-two patients who were aware that they had had a heart attack also were not disabled, and they continued their usual activities. The median period of disability was 12 weeks, based on the records of 228 patients for whom disability information was complete.

In this older-age group, myocardial infarction is not always incompatible with continued employment and a reasonable life expectancy.

Dr. Price's address is 275 Seventh Ave., New York 1.

The Cardiac in Industry

Eugene L. Coodley, M.D., Los Angeles

WITH AN estimated 10,000,000 persons in the United States suffering from heart disease, it is inevitable that many problems have arisen regarding the function and role of the cardiac in industry. The pendulum of opinion is beginning to swing from an earlier, fearful, half hearted acceptance of cardiac workers to a more rational acceptance of the increasing role they must play. This has come about through both an awareness of the need to preserve skilled individuals and a more scientific appraisal of the prognosis of cardiacs in industry when employed with adequate safeguards and supervision.

In prognosticating the late effects of cardiac trauma, whether by strain, effort, or directly, numerous studies have been carried out in industry, and the general impression has been a hopeful one. Studies by Hellerstein and Ford[1] at the Cleveland Work Classification Unit indicate that the average cardiac patient expends 3 calories of energy a minute in washing, shaving, and dressing, while walking around the block requires 6.6 calories a minute. A study of various types of work activities by ergometric measurement reveals that even a person engaged in one of the heavier types of occupation, such as welder, janitor, or fireman expends only 2.7 calories a minute on the average, and 4.2 to 6.7 calories a minute at a peak cycle of activity. In general, it has been found that Class I cardiacs can do 4 to 6.6 "calories of work" a minute and Class II cardiacs can do 2.7 to 4.0 calories a minute. Over 70% of cardiac patients fall into Class I or II.

Studies of the relation of activity to survival rate after myocardial infarction reveal that patients who are capable of resuming their usual or lighter work have an 80% survival rate within five years as compared with a 10% to 15% survival rate among patients remaining on complete or partial bed rest. A similar study by the Philadelphia Cardiac Work Classification Center on a follow-up of 519 cardiacs revealed that 75 to 95% remained in the same job category over a five-year period as recommended by the original physicians. The use of exercise-tolerance tests was reviewed by Bruce[2] recently, and the finding that clinical appraisal of functional capacity agreed with results of tests of exercise tolerance in only 7 out of 10 patients pointed up the importance of emotional factors in the rehabilitation problem present in many cardiac patients.

Rehabilitation

The problems of rehabilitation of the cardiac patient have been reviewed many times, and it is necessary to emphasize the need for early measures, the careful attention which must be paid to emotional factors, the importance of vocational guidance when changes in type of work become necessary, and the avoidance of implanting iatrogenic factors by an attitude of undue pessimism. The problem of rehabilitation of the cardiac is assuming increased importance today with a more widespread acceptance in industry of patients with a past history of heart disease as employees. Durbin and Goldwater[3] have pointed out that rehabilitation of the cardiac also involves rehabilitation of patients mistakenly diagnosed as having heart disease. Of patients referred to the Bellevue Classification Unit 28% were found to have no heart disease, and 25% of referrals to the Pittsburgh Unit likewise were free of the disease. These authors emphasized that successful rehabilitation depends on mental attitudes and working conditions, i.e., public welfare assistance, disability insurance, and prolonged litigation factors create a poor environmental stimulus for renewed work. In addition, problems of transportation to work, home conditions, and effects of compensation laws must be taken into consideration in planning rehabilitation.

In an analysis of 580 heart cases, Goldwater found no significant difference in functional capacity and incidence of secondary infarcts with

Dr. Coodley is Consultant to the California State Industrial Accident Commission and the California Department of Vocational Rehabilitation.

or without work. He stated that 75 per cent of patients with recovered infarcts are employable, and that 25 per cent of the jobs in industry are suitable for cardiacs. However, jobs entailing exposure to dampness, heavy lifting, working with the arms over the head, crawling, climbing, and working in cold temperatures were not recommended. In addition, patients whose conditions made them subject to dizziness should not be placed under working conditions such as high places where other employees might be endangered. In this series of 580 cases, the average period of recovery before return to work was six months. It was felt that, in an evaluation of ability to return to work, no one test was significant although response to the pulse and blood pressure to exercise, and measurement of the heart size were useful criteria.

Many problems arise in the determination of fitness of a cardiac patient to return to work. A study by the Cardiac Work Classification unit in Philadelphia,[4] covering several hundred cardiacs for a five-year period, has revealed that in almost half the patients, physical factors were less important than emotional ones in continuation of disability. Of 616 patients examined, 15.8% were found not to have heart disease. Slightly over 90% of the remainder were recommended back to full-time employment or else to work with limitations. Of the 331 patients who could be carefully followed for the five-year period, between 75% and 95% remained in the same job category as recommended originally by the Work Classification Unit. The medical status of 255 working cardiacs was judged improved in 58, unchanged in 156, and worse in 31; natural disease progression, however, accounted for some in the latter group. The opinion was expressed that most cardiacs under the age of 50 who suffer hypertension and/or coronary disease, have passive, dependent natures and are unable to express normal aggression.

Functional Classification and Work Energy Requirements

Gordon[5] has studied the expenditure of energy by various types of activity in attempting to determine job classifications for cardiacs (Table I).

He pointed out that three factors were important in regulation of physical activity; namely, work tolerance, duration, and intensity of work.

Tolerance can be measured by onset of dyspnea or angina with work or by exercise electrocardiogram. Duration depends on whether activity is continuous or intermittent. Intensity can be measured by determining the working-minute oxygen consumption. Scales have been devised in which energy costs of activities in terms of calories per minute are represented as multiples of unity (basal rate). Energy expenditure as an index of cardiovascular and respiratory stress has been established in numerous studies relating cardiac output and work and minute volume ventilation with oxygen consumption per minute. Over a wide range, for each calorie per minute increase in energy cost, cardiac output rises 1.5 to 2 liters per minute. In moderate to heavy work, cardiac work rises in direct proportion to metabolic work; at lower levels of caloric expenditure, cardiac work is increased to a lower degree. Physical activity is graded in terms of energy output in relation to the grade of heart disease, i.e. for Class A cardiacs, up to 5 calories per minute are allowed, whereas Class C cardiacs may be permitted only to 2 calories per minute with moderate restriction of ordinary activity (Table II).

In female cardiacs, energy output for housework often reaches 3 to 5 calories per minute, an effort comparable to bricklaying or driving a tractor. Tabular charts showing energy costs for various occupations, self-care tasks, and recreational activities serve as a useful guide in determining in a rough fashion the energy

Table I—Energy Costs of Activities in Occupational Therapy

Activity	Position	Calories per Minute
Leather punching or lacing	Reclining	1.2
Leather tooling	Reclining	1.2
Making link belt	Reclining	1.3
Rug hooking	Sitting	1.3
Chip carving	Reclining	1.5
Knitting, 23 stitches per minute	Sitting	1.5
Weaving on table loom	Sitting	1.5 to 1.8
Copper tooling	Sitting	1.6
Bookbinding, light	Sitting	1.6 to 1.9
Leather carving	Sitting	1.8
Typing, rapid	Sitting	1.8
Weaving on floor loom	Sitting	2
Chisel carving with mallet	Standing	2
Chisel carving without mallet	Sitting	2.2

Table II—Therapeutic Cardiac Classification

Current Rating	Suggested rating
A. No restrictions on activity	Up to 5 cal/min
B. Ordinary activity only	Up to 2.5 cal/min
C. Moderate restriction of ordinary activity	Up to 2 cal/min
D. Marked restriction of ordinary activity	Up to 1.5 cal/min

output required and in this way may help to guide the activity of a cardiac. A drawback to the use of the Master exercise test in determining functional capacity lies in its requirement of an expenditure of 8.5 calories per minute for a minute and one-half—this far exceeds the demands of ordinary work except in heavy industry.

However, a study by Robb, Marks and Mattingly,[6] indicated that the double standard two-step exercise test was a dependable method of detecting occult coronary sclerosis with the only unequivocal criterion being ST segment depression in excess of 0.5 mm in any lead. In following a series of 836 patients for a 10-year period, it was found that the incidence of acute occlusion was seven times higher in the group manifesting abnormal test results and the death rate was three times higher. Pordy, Master and Chesky,[7] in an earlier study, also felt that the Master test was quite reliable but recommended a battery of tests in an effort to delimit more accurately functional capacity in terms of latent disease.

The Cardiacs in Industry Committee of Los Angeles County[8] has published another method of classification in order to clarify the limitations which must be imposed. They emphasized that these limitations were designed to avoid the possibility of the cardiac becoming a hazard to fellow workers, i.e. by syncope, to avoid the possibility of sudden death by thrombosis or occlusion, and to avoid aggravation of the preexisting disease. Limitation 1 precludes operation of hazardous machinery by cardiacs subject to sudden loss of consciousness; Limitation 2 precludes heavy lifting or carrying (this category includes all patients with heart disease); Limitation 3 provides for ground-level work (this has application similar to Limitation 1); Limitation 4 avoids contact with or exposure to noxious agents; and Limitation 5 precludes extensive walking (intermittent, less than 50% of working time). Using the classification of the American Heart Association (Table III), persons with heart disease placed in functional classes I, II, and III, and therapeutic classes A, B, and C may be accepted for employment with appropriate limitations. With regard to coronary heart disease, patients with symptoms on less than ordinary activity with minimal signs of heart failure may be included in Limitations 1, 2, and 3, whereas patients with symptoms on ordinary activity are limited by 1, 2, 3 and 5; patients with no symptoms on ordinary activity, (i.e., asymptomatic recovered infarction patient) may have Limitations 1, 2, and 3.

*Table III—Clinical Evaluation of Functional Capacity of Patients with Heart Disease in Relation to Ordinary Physical Activity**

Class	Cardiac Symptoms	Limitations	Need for Additional Rest†	Physical Ability to Work‡
I	None	None	None	Full time
II	Only moderate	Slight	Usually only slight or occasional	Usually full time
III	Definite	Marked	Usually moderate	Usually part time
IV	May be present even at rest, and any activity increases discomfort	Extreme	Marked	Unable to work

* Modified from New York Heart Association, 1953.
† To control or relieve symptoms, as determined by the patient, rather than advised by the physician.
‡ At accustomed occupation or usual tasks.

Summary

Recent studies on prognosis of cardiacs in industry have suggested a more optimistic attitude than that previously held.

Problems that must be coped with in any program of rehabilitation are reviewed.

Methods of functional classification of cardiacs in terms of type of job suitability on the basis of measured caloric output would seem to afford a more rational basis for job determination.

Specific limitations for varied types of job activity on the basis of heart classification, dangers to fellow employees, and probability of increasing cardiac damage are cited as a practical basis of job selection.

Dr. Coodley's address is 6010 Wilshire Blvd., Los Angeles 36.

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The Magnitude of the Heart Disease Problem

Joseph B. Tauber, M.D., Dr. P.H., Aliquippa, Pa.

Need for Determining the Magnitude of the Heart Problem

The great variety of consequences of heart disease, the efforts of many kinds of scientists to control this malady, and the generous support of these efforts by private and public funds all make for an interest, if not a necessity, to achieve an accurate measure of the magnitude of the heart disease problem. Of the groups and agencies with an interest in such a measurement, three have special relevance to the present discussion. Teachers and practitioners of clinical medicine need this information to make good judgments about the emphasis to be given to the subject in education and training, the allotment of time and resources to such programs, and the development of facilities for diagnosis, treatment, and rehabilitation of persons with heart disease. The official and voluntary agencies of public health whose responsibilities include the assignment of administrative and operating personnel and the allocation of public funds to support research and education for the control of health problems can discharge these responsibilities well only if the relative magnitude of the various problems are known.

Industry and industrial medicine have need of accurate information on the magnitude of all chronic disease problems for the sake of making good personnel policies. For example, the acceptance of "cardiacs" for employment depends upon four variables: the prevalence of cardiacs in the available labor market, the proportion of cardiacs among those persons already on the payroll, the degree of job placement control available to management, and the financial risk per case. The last is related principally to the possibility that workmen's compensation law administrators will ascribe the complications of heart disease to incidents at work, whereas the likelihood that accidents will result from some aspect of heart disease in the employee is usually relegated to a minor consideration where placement control can be exercised. All of these variables can be assessed by the employer with respect to their bearing upon the employment of job applicants; and the assessments will hold as well for continuing in service those employees who have heart disease, except that greater liberality is usually exhibited toward the latter.

A second, practical use to be made in industry of information on the true nature and size of the heart disease problem in the general population is the provision of a reliable comparison standard in the industrial medical program. If as a result of a case-finding program at the plant it is discovered that the proportion of employees with heart disease is greater than is the case for the general population, one or more of three unpleasant hypotheses must be entertained: There has been overdiagnosis in the case-finding program; some factor common to the employed group favors the development of heart disease at an undue rate; and/or less than average clinical skill was used in the selection of applicants for work. If fewer than the expected number of cases are discovered, one or both of two hypotheses must be entertained: An unusually severe rejection of applicants with heart disease was practiced at the preplacement examination; and/or there was underdiagnosis in the case-finding program.

Reported Studies on the Magnitude of the Problem

The magnitude of the heart disease problem may be described in the terms of its prevalence and incidence. Prevalence is defined as the number of cases per unit of population at a given

Dr. Tauber is on the staff of the Health Center at Aliquippa Works Division of the Jones & Laughlin Steel Corporation.

point in time, without reference to their dates of onset or occurrence. Incidence is defined as the rate of new occurrences over a specific time span per unit of population at risk during the period of study.

General Population Studies—The information from mortality and autopsy studies clearly is not sufficient to permit calculation of prevalence rates. Questionnaire-interviews, introduced some 25 years ago, are today not considered a suitable basis for the determination of reliable prevalence rates of specific diseases.

Information which is unquestionably valid on the prevalence of a disease, such as heart disease, would require adequate examination of all members of a population, say of all the inhabitants of a given country, at a given time. A repetition of this enterprise at fixed intervals to discover new cases would establish with equal validity the incidence rate of heart diseases. Even if such programs were possible, the information gained would hardly be worth the cost. Recourse is had, therefore, to the design of random population samples whose prevalence rates may be extrapolated to the total population. The confidence with which the extrapolation can be made is dependent upon representativeness of such a sample, upon the proportion of the persons in the sample participating in the study, and upon the thoroughness of the examinations performed. Good incidence studies can be made with the life table approach. In this method a clearly defined sample—cohort—is followed forward in time to determine occurrences of the events under study. Continuation of such a study over many years tends to be difficult because of financial cost as well as the statistical problems that arise when members of the cohort are lost to the study. On the other hand, the difficulties of extrapolating observations of limited populations as well as the obstacles to comparability among such studies are also great, as illustrated in the short review below.

Public Health Studies—Several very well conducted studies have reliably determined the incidence and/or prevalence of heart disease of certain age groups of regional populations. The study of a random sample (cohort) which for several years has been conducted in the community of Framingham, Mass., for the determination of the causative factors of coronary heart disease has produced reliable information about selected age groups of the population of that community. The incidence rate of coronary heart disease in this population has been determined to be approximately 1% per year in males of the age group 45 to 62 (Dawber and Kannel[1]). Chapman[2] reported the prevalence of heart disease in Framingham to be 93 per 1,000 persons (9.3%) in the age group 30 to 59, and he referred to a study conducted in Baltimore which established the prevalence of heart disease in that community to be 122 per 1,000 in the age group 35 to 64.

Hospitalized Patients—A frequently encountered type of report is that which presents the prevalence of heart disease among patients admitted to general or special hospitals. The advantage of this method is that the diagnosis can be made available without direct cost to the study. The principal disadvantage, in this country at least, is the impossibility of relating hospitalized patients to a clearly defined population.

Heart Clinics—Standard cardiac clinics which are maintained for research, teaching, and service purposes, as well as the more recently established cardiac work evaluation clinics, have greater limitations than do hospitals in the provision of information regarding the magnitude of the heart disease problem. Even within the general category of heart disease, the proportion of different types vary too much because of the particular interest of the attending clinicians to make community extrapolation acceptable; and the population base from which the patients come is even less readily determinable than is the situation with hospitals.

Community Case-Finding Drives—Community screening programs which depend upon the examination of volunteers produce data which are not suitable for the determination of prevalence rates. Such studies are always suspect because of the possibility of bias occasioned by the self-selection of the participants. These limitations bias the representativeness of the examinees, whose motivations and inhibitions also cause variations in the amount and quality of information supplied.

Industrial Studies—Employed groups in general are favorably looked upon as offering certain advantages for epidemiologic studies. The employees comprise a "captive" population, whose stability and accessibility are reasonably satisfactory. Where machine-card reports are kept, the selection of a statistical sample is quickly accomplished. An example of a limited study of an employed group is that in which La Rotonda and Guidotti[3] found electrocardiographic abnormalities in 12.2% of 3,340 hotel employees of the ages 45 years and older. Another study, in Italy,[4] established that 7.78% of workers were absent for heart disease during 1954. Studies of prevalence of heart disease among various levels of administrators or of persons in any other single kind of employment,

or of limited age groups of a population have the disadvantages of nonrepresentation of the general population. A further disadvantage of studies reported from industry, and, as a matter of fact, from all population studies of heart disease reported to date, is the lack of uniformity in observations made, rendering comparisons of different studies of similar limited population groups very difficult. All things considered, then, industrial studies have thus far not provided satisfactory answers to questions of prevalence and incidence of heart disease in the general population.

The Arsenal Health District Study

About five years ago the departments of occupational health and biostatistics of the Graduate School of Public Health, University of Pittsburgh, carried on a joint study to learn the prevalence of various kinds of heart disease among persons of working age. The study has been published in detail elsewhere, and is briefly reviewed here for the purpose of illustrating an acceptable method of determining the prevalence of heart disease.

Selection of Examinees—The population chosen for the study was the inhabitants of Pittsburgh's Arsenal Health District. This area, according to the 1950 census, had a total of 81,785 inhabitants. In 1951 the Department of Biostatistics, in line with its own interests at the time, had devised from this population a sample of 9,396 persons, which was representative of the study area and sufficiently well characterized as to permit extrapolation to still larger populations; and in the following year the persons in the sample had been interviewed in their homes for various purposes, among them the completion of a general health questionnaire. Persons 15 years of age and above were selected from this sample on the basis of responses to questions pertaining to heart disease, in accordance with the following plan.

The sample population of 9,396 contained 7,130 persons who were 15 years of age and above, and these comprised the study's universe. It was possible to divide these people into three groups on the basis of their responses to questions bearing upon heart disease, at the time of the household interviews:

A. Those who believed that they had heart disease
B. Those who did not believe that they had heart disease but reported symptoms suggesting the possibility of such a diagnosis
C. Those who did not believe that they had heart disease and who had no symptoms suggesting that diagnosis.

Group A was the smallest of these groups, and all of its members were subsequently scheduled for clinical study. Since it would have been impractical to examine all the members of groups B and C, random samples were chosen from these two groups in such a way as to be representative of their age and sex distribution. Subsequently in the calculation of rates proper weighting was given to the size of the samples chosen, so that the rate found represented a sound estimate of what would have been found had all been examined. The persons in Group A and those chosen for examination from Groups B and C totaled 730 examinees. Findings among these could be extrapolated to the study universe of 7,130 and, in turn, to all persons of working age in the Arsenal Health District's 81,785 inhabitants.

Operation of the Study—Early requirements of the study included a careful selection of criteria for the identification of heart disease, the exact delineation of all data which had to be collected by the examinations, development of a time table of the progression of the study, development of administrative procedures, selection of a staff, and the raising of funds to defray the project's budget. The cooperation of the sample individuals, of medical and the social organizations, and of the press of the area had to be enlisted. The statistical procedures were defined, and techniques were devised to adjust for the loss of sample persons in the study. The actual study was preceded by a small test run. The sample persons were first interviewed at their homes by lay interviewers, who developed medical and occupational histories and scheduled the examinations. Elaboration of the history by the full-time project physician preceded the clinical routine, which included physical examination, electrocardiogram, chest roentgenogram, urinalysis, complete blood count, and serology studies. Each individual was categorized as a cardiac, a questionable cardiac, or a non-cardiac on basis of these findings, and then the examination was repeated by a group of cardiologists who volunteered their services to the project. At this reexamination many examinees were fluoroscoped, and several of them had additional special examinations, such as repeated electrocardiograms, electrocardiography after atropinization, Master's test, additional 14 by 17 inch chest roentgenograms in different views, and x-ray kymography. Each diagnosis of heart disease or questionable heart disease was agreed to by at least three cardiologists in a conference after all examined the person.

Results—An appropriate analysis of the data of the study supports the conclusion that some

form of heart disease is present in 14% of persons living in Arsenal Health District who are 15 years of age and older. A substantial proportion of these cases are among women who are more than 65 years of age. The distribution of the cases among the age groups of 15 to 64 is given in the accompanying Table.

Estimated Heart Disease Among the General Population, Arsenal Health District, Pittsburgh, 1953-1954

Age Group	Prevalence Rates, %	
	Males	Females
15-44	3.1	4.78
45-64	19.76	22.29
15-64	8.5	10.50

The prevalence rate for people actively employed at the time of this study was 8.6%. The actual number of cases was too small to support valid determination of separate rates by age and sex. This percentage was substantially lower than the corresponding figure for the general population, and was not unexpected. One finds a few disabled and self-employed cardiacs among the general population who are not represented in the statistics of the employees. This 8.6% is a figure of considerable interest to industry, because it approximates the proportion of cardiacs who can be expected among an average plant population which draws its employees from a community such as the one studied.

The estimates of prevalence of heart disease in different age and sex groups of the population suggested that females develop heart disease generally at a slightly earlier age than do males, but they outlive their male counterparts. The prevalence of heart disease among the female 15 to 44 year age group was slightly higher than among the males of the same age group. The highest estimate for males was in the age group of 55 to 64, while for females it was in the 65 to 74 age group. Our conclusions from these figures were that male cardiacs die earlier than female cardiacs, and their deaths occur rather rapidly after the age of 64 years. It was interesting to learn later, after our study was completed, that Dr. Fitzgerald Peel, in a study of coronary artery disease, found that in men the incidence reached a peak at the age of 55 to 59 and thereafter fell steeply.

After the examinations we could compare our findings with the statement of the individual's own appraisal of his cardiac status as revealed in the earlier household interview study. These comparisons revealed that 25% of those who believed that they had heart disease were found to be free of this condition. On the other hand, we found cardiacs among those who believed themselves to be completely free of heart disease. These cases could not have been found by questionnaire or interview methods, and very few had records of heart disease at hospitals and clinics; nor could the prevalence of cases of this kind have been learned in analyses of death certificates. This group would have remained hidden to any other study method, and we therefore called them "hidden cardiacs." We found that 64% of these cases belonged to the 35 to 64 year age group. Thus nearly two-thirds of the hidden cardiacs—equaling about 7% of the 35 to 64 age group—are of employable age. These are people who have no cognizance of their heart disease, whose cases can be identified only by careful examination.

Summary and Conclusions

Knowledge of the incidence and prevalence of heart disease in the general population is of great help in the development of successful plans for certain areas of clinical medicine, public health, and industrial medicine. The information is a requirement for planning of education, training, and research, as well as for the provision of facilities for diagnosis, treatment, and rehabilitation. Industrial physicians and management need the information for formulating good personnel policies and for base line comparison standards in medical progress.

Acceptable determinations of incidence depend upon observation on a random population sample (cohort) over a period of time to learn the rate of occurrence of new cases of heart disease. Reference is made to the Framingham, Mass., study, in which good, though somewhat limited, information of this kind is being produced. The incidence rate of coronary heart disease in this population has been determined to be approximately 1% per year among males 45 to 62 years of age.

A review is presented of a previously published study of the prevalence rate of heart disease in a population sample of the Arsenal Health District of Pittsburgh. The over-all prevalence rate among persons in the 15 years and older age groups was estimated to be 14%. The condition had been previously unknown and unsuspected, and was diagnosed for the first time in the study, among 11% of the sample population. An estimation was made that 7% of persons in the 35 to 64 year age group were "hidden cardiacs" of this type. On the other hand, 25% of all persons in the study population who believed that they had heart disease were found to be free of this condition. The prevalence rate for people actively employed

at the time of the study was 8.6%, a figure considered to approximate the proportion of cardiacs among an average plant population which draws its employees from a community such as the one studied.

The selection of random population samples and the processing of data in such a way as to support reliable extrapolation to the general community require technical competences which are not acquired in the usual course of medical training. The physician who intends to carry on a study of this type is advised to get the help of an experienced statistician before the study is begun.

Dr. Tauber's address is Jones & Laughlin Steel Corporation, Aliquippa, Pa.

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THE 1959 ANNUAL MEETING AND SCIENTIFIC SESSIONS

of the

AMERICAN HEART ASSOCIATION

will be held

October 23-27, 1959

in

PHILADELPHIA, PENNSYLVANIA

The Scientific Sessions are scheduled for October 23-25 at the Trade and Convention Center. The Annual Meeting of the National Assembly, delegate body representing all program interests and geographical areas of the Association, will be held in the Hotel Bellevue Stratford, October 26-27. Further information may be obtained from the American Heart Association, 44 East 23rd Street, New York 10, New York.

Report of the Commission on Medical Care Plans

Robert B. O'Connor, M.D., Pittsburgh

THE Commission on Medical Care Plans of the American Medical Association, under the chairmanship of Leonard Larson, M.D., has now released a report on its three and one-half years of study of various types of medical care plans in the United States. In two-volume form, Part I* expresses the findings, conclusions, and recommendations of the Commission, and Part II presents the statistical and other supporting data of the study.

Whatever relationship the opinions of the reader, including those of the reviewer, may have to the attitudes, conclusions, and recommendations of the Commission, this report should be read by every industrial physician. The study has considered many problems whose solutions will determine the future of the practice of medicine.

The Report is divided into four major sections: (1) Miscellaneous and Unclassified Plans, (2) Medical Society Approved Plans, Including Blue Shield and Private Insurance Programs, (3) Industry Programs, and (4) Student Health Services.

The first section, on Miscellaneous and Unclassified Plans, is the longest, the meatiest, and in many ways the most important section of the Report. Into this section are placed those plans that do not fit into the other three categories listed above. The result is a potpourri of wide-ranging variety, that includes such things as Employee Mutual Aid Societies, a "check-off" system in a mining town, various forms of prepayment group-practice clinics, sundry union health centers (some offering only diagnostic services and some full ambulatory medical care), the UMWA Welfare and Retirement Fund, the Health Insurance Plan of Greater New York, the Kaiser Foundation Health Plan, and many others.

From field studies of 19 of these plans, the committee has attempted to appraise the quality of medical care being furnished. Despite misgivings, the committee states that it observed no lay interference with the rendition of medical services. However, they feel that "the threat of law dominance is ever present." In general, the committee concludes that "The professional training of physicians who provide services in the plans visited appears to compare favorably with that of other physicians in the community." The physicians consider their remuneration and fringe benefits acceptable, though "compensation appears to be lower than the income of physicians in private practice in the community."

The Report states that the term "prepaid comprehensive medical care" is misleading, since these plans all have limitations. While they may offer much, none of them offers all necessary medical care.

Medical societies and local physicians have displayed different attitudes toward these plans, depending on the plan's sponsorship, despite the fact that the plans may have similar characteristics. In general, physicians serving the plans are members of local and state medical societies; some are or have been elected or appointed officers. The committee feels that a closer relationship with, indeed prior approval by, the local medical societies is needed. Choice of physician by the patient is limited, since most of these are closed-panel systems.

Consideration is given to the question of the continuity of medical care, which the proponents of many of these plans feel is attainable only through the prepayment group-practice method. Admitting that, "Both advantages and disadvantages with respect to continuity

Dr. O'Connor is Medical Director, United States Steel Corporation.

*Part I has been released as a special supplement with the Jan. 17, 1959, issue of *The Journal of the American Medical Association*, Vol. 169, No. 3.

appear to exist in the traditional patient-physician type of practice as well as in the clinic practice conducted by large staffs of physicians," the Committee lists 11 ways in which these plans may lose the continuity of patient care. For example, emergencies may arise when the clinic is closed; if there is provision for home calls, these may be on rotation assignments; hospitalized patients may be under the care of hospital physicians with little relation to the general physicians, etc.

Regarding utilization of services, "It was surprising to note that as few as 15% of the members, and even less in some instances, took advantage of the service of some plans in a one-year period. The maximum utilization reported was 85%."

Despite the emphasis on the part of many of the physicians of these plans that "preventive medicine" was an important and valued part of the plan, the Committee felt that early diagnosis, rather than disease prevention, would be a more accurate term in relation to the medical service of these plans.

Administrative costs were found to range from 9% to 30% of income. Facilities in general were found to be adequate for services rendered. On the whole, medical records appeared to be satisfactory.

A variety of methods of meeting complaints of patients was found. By the nature of direct-service plans, complaints are not brought to the attention of the medical society but are handled within the plan itself. In the other types of plans, complaints were handled in some instances through a liaison committee of the medical society, with varying degrees of effectiveness.

There was a wide range of variation in occupation and income of the beneficiaries of the plans, with a preponderance of low-income, unskilled or semi-skilled employees.

A somewhat lengthy review of the attitudes of medical societies toward these plans is presented, derived from discussions with 89 local and state medical society representatives. In brief the Report states, "It can be pointed out that approval and disapproval, acceptance and lack of acceptance, cooperation and lack of cooperation, have existed almost side by side for plans of similar nature at various times and in various parts of the country. There appears to have been relatively free acceptance of many management-sponsored plans by physicians, but acceptance of plans sponsored by unions or consumers has been somewhat reluctant."

Some selected attitudes, found among sponsors, members, and participating physicians of these plans, are reported with the note that this does not imply that the committee agrees with them. For example, "Many of these groups believe that the closed-panel practice of medicine is the best means of providing good medical care at low cost." "Changing social philosophies have also resulted in increased support for these plans, as has the desire among the general public for continued improvement in methods of financing and provision of medical care."

The second chapter of the section devoted to the Miscellaneous Plans is a most interesting compendium of various relevant laws. Those relating to the organization and operation of these plans are found to vary widely from state to state; "not-for-profit" is an enabling element in many states, and the use of partnerships of doctors, unincorporated associations, and trusts permits the development of prepaid, closed-panel service systems in other states where they might otherwise be prohibited. The assistance of the Taft-Hartley Act, which permits prepaid medical care to be developed through collective bargaining, is noted.

The statement is made that, while medical societies may adopt standards for members, "by taking action against physicians because they render service for prepaid plans, including closed-panel plans, they may in certain circumstances violate federal or state laws relating to restraints of trade." The committee states that there are lawful actions permitted to medical societies regarding these plans, among which are argument, persuasion, publicity, legislative action, and competition.

A third chapter, concerning free choice of physicians, reaffirms the AMA stand that this is an important factor in attaining the highest possible standards of medical care. Here begin the engaging footnotes that represent the dissenting views of Dr. Leo Price. Here, too, is the statement, "In the closed-panel, direct-service type of plan visited, the committee has uniformly observed care of good quality made available to patients who do not have 'free choice of physician' in the literal sense of the term."

The section ends with conclusions regarding the objective of the Commission. For example: 1. What are the effects of these plans on the quality of medical care? Quality is at average level, improved for the low income group, and as fragmented as it may sometimes be in conventional medical practice. 2. What is the effect of these plans on the quantity of medical care? They have increased it. 3. Does the introduction of a third party in the patient-physician relationship tend to disturb it and result in an inferior quality of medical care?

For those who never had a personal physician, the result has been more and better care. However, five factors are listed that could be disadvantageous, and the conclusion is reached that, if most physicians found it mandatory to practice in such a "third party" situation, it would deter good men from becoming physicians. 4. Will these plans encourage the corporate practice of medicine, especially hospitals? The committee, with reservations, feels that these plans might well do so.

The committee urges a judicious, tolerant, progressive attitude toward these experiments in medical care systems.

The second section of the Report covers "Medical Society Approved Plans, Including Blue Shield and Private Insurance Programs." These plans maintain the free choice of physician and the fee-for-service system, while a majority of the miscellaneous plans do not. The section begins with a brief history that emphasizes the role of organized medicine in the development and growth of these plans, especially Blue Shield. There follows a description of how data regarding these plans were collected, and reference is made to the extensive compilation offered in the second volume, Part II, of the report. The fundamental principles of insurance are stated. The committee feels that recurrent or inconsequential costs should not be covered by these plans. A brief description of "basic" and "major" hospital and medical expense benefits is included in the Report.

The committee concludes that these plans, with some reservations, do not affect the traditional doctor-patient relationship, do not result in inferior medical care, and do not promote violation of medical ethics, but may, in some circumstances, promote the corporate practice of medicine, especially by hospitals. The relationship between the medical profession and the insurers should be one of "free and sympathetic cooperation without prejudice or bias."

This section ends with "Additional Observations," some of which are: The profit motive is the wholesome driving force of private enterprise and is not inappropriate in the health insurance field. Voluntary insurance should be controlled and operated by those who bear the responsibility for its success. Merit rating on preferential risk groups should be applied with restraint. Duplicate coverage should be avoided. Physicians should recognize their moral responsibilities for safeguarding these plans from abuse.

The third section of the Report is entitled "Industry Programs" and is concerned primarily with occupational health programs. The first chapter reprints in its entirety, the statement on the "Scope, Objectives, and Functions of Occupational Health Programs," approved in June 1957 by the American Medical Association House of Delegates,* which must now be familiar to all industrial physicians. The second chapter presents some statements that will be of concern to the physician in industry. For example, referring to medical care for nonoccupational conditions in the plant medical department, ". . . of the 244 companies, 86 provide partial medical care, i.e., care beyond first aid, and 24 more provide comprehensive care, including dependents in some cases, in company medical facilities." (In Part II of the study, this is called "one of the most significant disclosures of the study." The conclusions are based on only a 7% return of questionnaires mailed to almost 3,000 members of the Industrial Medical Association.)

Also aired are some of the conflicts so familiar to industrial physicians: The general practitioner feels that the physician in industry is encroaching on private practice and is interfering in the patient-physician relationship. The industrial physician criticizes the general practitioner for indiscriminate illness certification, being uninformed about etiology and diagnosis of occupational diseases.

There is presented in full the American Medical Association Council on Industrial Health statement of 1955 on "Medical Relations in Workmen's Compensation." This statement contains the oft-repeated complaint that the medical profession has not been consulted in the development of workmen's compensation statutes. It reaffirms the tenet that there should be free choice of physician in workmen's compensation cases. Rehabilitation should be an integral part of the system. There should be a liaison, advisory committee of the medical profession with the administrative agency of the system. The treating physician should accept his responsibility for making reports, testifying, using consultants and rehabilitation services, and making scientific evaluations of permanent disability. "The administrative agency should have a medical director, approved by the medical profession, and a qualified vocational counselor." Further opinions are offered regarding amount and method of indemnification.

The final chapter of this section offers some conclusions that merit being quoted here, for the attention of industrial physicians: ". . . less than half the medical directors maintain a direct professional relationship with the family

Journal of the American Medical Association 164: 1104 (July 6) 1957.

physician." "The existence of widespread friction and misunderstanding is evident between the plant physician and private practitioner." "It is apparent that many medical directors are not familiar with, or attaining the objectives and fulfilling the goals of occupational health programs." "Some physicians in in-plant medical programs appear to be engaging in activities which might lead to interpretations of violations of the Principles of Medical Ethics."

The section ends with the suggestion that if industrial physicians would adhere to the AMA's statement on Scope, Objectives, and Functions of Occupational Health Programs, and if the medical profession would implement the report on Medical Relations in Workmen's Compensation, then things would be much better indeed.

The fourth section of the Larson Report covers "Student Health Services," a subject that the Committee considers of less immediate interest and concern. Its conclusions were reached primarily from reading previously existing reports and studies on the subject. Student health services may include complete medical care, as well as health maintenance. Apparently this is considered acceptable to the medical profession, because the student-physician relationship is transient and temporary. Hence it is felt that the private physician is not entirely or permanently replaced.

The final section of the Report contains recommendations regarding each of the four subjects covered, a sample of which has been presented above.

The Larson Commission Report is the most significant compendium of data, attitudes, and opinions regarding medical care plans that this reviewer has ever seen, whatever one may think of its accuracy or validity. Because the Report is a concentrated distillate of three and one-half years of study, it has been difficult to attempt to distill it further for this review and yet do justice to the wide range of the Report. It is hoped that enough of its flavor has been offered here to encourage reading the original. It should be read, indeed studied, by every industrial physician.

Dr. O'Connor's address is United States Steel Corporation, 525 William Penn Place, Pittsburgh 30.

PREVIEW ANNOUNCEMENT
5TH INDUSTRIAL HYGIENE CONFERENCE
on
HEALTH ENGINEERING IN THE SPACE AGE
at
THE UNIVERSITY OF TEXAS
Austin, Texas
MAY 8, 1959

The Conference will be sponsored by the Occupational Health Division, Texas State Department of Health; the College of Engineering, The University of Texas; the North Texas Section, American Industrial Hygiene Association; and the Gulf Coast Section, American Industrial Hygiene Association.

Guide for the Evaluation of Hearing Impairment

The following "Guide for the Evaluation of Hearing Impairment," prepared by the Subcommittee on Noise, has been adopted for publication by the Committee on Conservation of Hearing of the American Academy of Ophthalmology and Otolaryngology.

DEAN M. LIERLE, M.D.
Chairman, Committee on
Conservation of Hearing

THE FOLLOWING statement of principles, prepared by the Subcommittee on Noise and approved by the American Academy of Ophthalmology and Otolaryngology, is presented as a guide for the evaluation of hearing impairment* regardless of the cause or causes of such impairment. These principles are based on current medical opinion. The Subcommittee on Noise reaffirms the principles concerning the evaluation of hearing impairment already set forth jointly by it and by a cooperating subcommittee of the American Medical Association.† The Subcommittee on Noise now recommends the following interim method for measurement and calculation.

Ideally, hearing impairment should be evaluated in terms of ability to hear everyday speech under everyday conditions; the term "impairment" will be used hereinafter in this sense only. The ability to hear sentences and repeat them correctly in a quiet environment is taken as satisfactory evidence for correct hearing for everyday speech. Because of present limitations of speech audiometry, the hearing level‡ for speech should be estimated from measurements with a pure tone audiometer. For this purpose, the Subcommittee recommends the simple average of the hearing levels at the three frequencies 500, 1000 and 2000 cps.

In order to evaluate the hearing impairment, it must be recognized that the range of partial impairment is not nearly as wide as the audiometric range of human hearing. Audiometric zero, which is presumably the average normal hearing threshold level, is not the point at which impairment begins. If the average hearing level at 500, 1000 and 2000 cps is 15 db or less, usually no impairment exists in the ability to hear everyday speech under everyday conditions. At the other extreme, however, if the average hearing level at 500, 1000 and 2000 cps is over 82 db, the impairment for hearing everyday speech should be considered total. The Subcommittee on Noise recommends the following formula: For every decibel that the estimated hearing level for speech exceeds 15 db, allow 1½% up to the maximum of 100%. This maximum is reached at 82 db.

At this time, the Subcommittee on Noise makes no specific recommendation regarding a correction for a shift in the hearing threshold due to age, because the relation of presbycusis

Please communicate with the Director of Research, Research Center, Subcommittee on Noise, 111 N. Bonnie Brae St., Los Angeles 26, for reprints or information concerning this publication.

This guide is also being published in the March-April issue of the *Transactions of the American Academy of Ophthalmology and Otolaryngology.*

*"Impairment" is here used as defined in "Guides to the Evaluation of Permanent Impairment" approved by the Committee on Medical Rating of Physical Impairment, *J.A.M.A.* 168:475, 1958. "Impairment" as defined by the American Medical Association denotes a medical condition that affects one's personal efficiency in the activities of daily living. It is recognized that "disability" as used in various workmen's compensation laws involves non-medical factors, since it may be related to actual or presumed reduction in ability to remain employed at full wages. Permanent impairment is, therefore, a contributing factor to, but not necessarily an indication of, the extent of a patient's permanent disability within the meaning of the workmen's compensation laws.

†Principles for Evaluating Hearing Loss, Report of the Council on Physical Medicine and Rehabilitation, *J.A.M.A.* 157:1408, 1955.

‡The hearing level of the listener is the number of decibels that his threshold of hearing lies above the standard audiometric zero for that frequency. It is the reading on the so-called "hearing loss" dial of an audiometer that is calibrated according to American Standard Z24, 5-1951 (American Standards Association). (March 21, 1951).

to noise-induced hearing loss is not yet fully understood.§

The Subcommittee on Noise recommends that any method for the evaluation of impairment include an appropriate formula for binaural hearing which will be based on the hearing levels in each ear tested separately. Specifically, the Subcommittee on Noise recommends the following formula: The percentage of impairment in the better ear is multiplied by five (5). The resulting figure is added to the percentage of impairment in the poorer ear and the sum is divided by six (6). The final percentage represents the binaural evaluation of hearing impairment.

§For current information about the relation of hearing threshold to age, see Table XXII, 1954 Wisconsin State Fair Hearing Survey (Median Values for Office Workers), Published by the American Academy of Ophthalmology and Otolaryngology, 1957.

Example illustrating the use of the above recommendations:

cps	500	1000	2000	3000	4000	6000
Rt. (db)	15	20	30	40	55	45
Lt. (db)	10	10	20	35	50	45

Frequencies most important for the understanding of speech.

Right Ear (db)	c/s	Left Ear (db)
15	500	10
20	1000	10
30	2000	20
65		40

$\frac{65 \text{ db}}{3} = 21\frac{2}{3}$ db estimated hearing level for speech

$\frac{40 \text{ db}}{3} = 13\frac{1}{3}$ db estimated hearing level for speech

To convert estimated hearing level for speech to percent impairment of hearing:

$21\frac{2}{3}$ db estimated hearing level of speech
-15 db hearing level for speech which is upper limit of the no-impairment range
$6\frac{2}{3}$ db rounded out to nearest digit = 7 db

7 db × 1.5% per decibel = 10.5% impairment of hearing in right ear.

Go through the calculation again for left ear. The percent impairment of hearing is zero in this case.

To convert the monaural impairments to percent binaural impairment the formula is:

[(percent impairment in better ear x 5) plus (percent impairment in worse ear)] ÷ 6.

Therefore
[(0% × 5 = 0%) + 10.5%] ÷ 6 = 1.75% binaural impairment.

THE COUNCIL ON POSTGRADUATE MEDICAL EDUCATION

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will present

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Medical and surgical aspects of recent advances in the diagnosis and treatment of heart and lung diseases will be presented. Tuition is $100, including luncheon meetings. Further information may be obtained from the Executive Director, American College of Chest Physicians, 112 East Chestnut St., Chicago 11.

Topical Review

Evaluation of Toxicological Data

David W. Fassett, M.D., Rochester, New York

EVERY physician who engages in occupational medicine is faced, to some degree, with the problem of interpretation of experimental toxicological data. If he is associated with a chemical industry, this interpretation becomes a part of his daily routine. However, since there are practically no manufacturing industries which do not use a number of chemical substances, it is important that every physician in this field know something about the methods of toxicological testing which are currently in use. Even more important, he must be aware of the many pitfalls in interpreting the data obtained from these tests.

While the physician in occupational medicine usually has ample opportunity to develop knowledge from daily personal experience in the fields of preplacement examinations, treatment of industrial injuries and illnesses, compensation problems, industrial relations problems, and the like, it is rare that he has the same kind of daily stimulus and opportunity to develop competence in the field of toxicology.

The remarks to follow are addressed primarily to the physicians who may not have had first-hand experience with toxicological research. Some of the methods in common use will be described briefly, together with some of the variables affecting the results.

Since many manufacturers include some toxicology data in brochures on new products, the physician may be asked to interpret these and to extrapolate animal data to the human. At other times, he may be asked for advice about the safety of a material that has been proposed for a particular use and, if adequate toxicological data are not available, to suggest the type of testing necessary to establish safe handling procedures.

Methods

The methods of toxicological evaluation can be classified as to the route of administration of the chemical, the duration of exposure, and the type of biological response.

Dr. Fassett is Director, Laboratory of Industrial Medicine, Eastman Kodak Company.

The routes of administration usually include oral or parenteral injection, not because this type of contact will be frequently encountered in industry, but because such information is valuable as an over-all index of potency of toxic effect and because it is relatively easy to obtain. Studies of the action on skin and eye are always important. The effects of inhalation should always be known if the use and physical properties of the material are such that exposure by this route is likely to occur.

While each laboratory has its own techniques for doing the tests, there is a certain amount of similarity in methods. In the single, oral-dose test the material is usually given by stomach tube according to body weight and is dissolved in water where possible or some solvent of low toxicity such as corn oil or propylene glycol. Rats are frequently used, and the dose range is usually wide; for example, 50 to 5,000 mg/kg of body weight for a preliminary, or "range-finding," test. Only one or two animals per dose are necessary for this purpose. If a more accurate estimate of the slope and position of the dose response curve is desired, then 5 or 10 animals per dose may be needed.[1,2] The animals are usually observed for 14 days following administration. Repeated doses may be given orally by tube or by incorporation in diet or water. The same procedures may be used with parenteral injections, although the effective doses will frequently be smaller and the choice of solvents limited.

Tests for skin irritation and skin absorption are frequently done by applying the substance to the clipped skin of the rabbit or guinea pig.[3] A wide variety of methods of application can be used; e.g., simple inunction with a glass rod, patch tests, or rubber or plastic cuffs to hold materials in contact with the skin. Factors such as concentrations, solvents, dose per kilogram of body weight, amount of surface area exposed, duration of contact, and method of removal from the skin at the end of contact must be considered. The amount of local effect can be recorded roughly by grading any swelling, redness, or other reaction. Evidence of ab-

sorption may be found by chemical measurement in blood or urine or by observing toxic effects or weight loss. Evaluations of the effects of repeated exposures are often made in the same manner.

Skin sensitization can be studied in the guinea pig. The original work by Landsteiner[4] made use of repeated intracutaneous injections, although, for many years, some laboratories have made use of topical application in suitable solvents.[5] The essence of both of these methods is to compare the degree of skin reaction which results from the first contact with that which results after a series of repeated properly spaced contacts. The guinea pig can be sensitized to many known potent human skin allergens, such as aromatic amines, nitro compounds, catechols, expoy compounds, and mercaptans.[6] However, the principal use of this test is to recognize potent sensitizers, and it should only be used in preparation for and as an adjunct to human studies.

Irritant effects on the eye are usually studied in the rabbit,[7] and the tests generally give results comparable to those in man.

Inhalation studies are commonly carried out by introducing a known mixture of chemicals and air into a chamber containing the experimental animals. In the case of gases or volatile solvents, this can be done by simply blending the gas or vapor at a known rate with the introduced air. For high boilers, plasticizers, or oils, it is usually necessary to apply heat or atomize the material. With the use of suitable methods, dusts can be metered into the air stream of an exposure chamber. In all these inhalation methods it is essential to check the calculated amounts by actual measurement in the air in the exposure chamber. The particle size distribution should be determined in the case of dust or mists. The dosage can be varied by concentration and time. An example of a solvent inhalation study is that by Torkelson[8] on methyl chloroform. A dust study is illustrated in the articles by Schepers and associates.[9-13]

In describing the duration of an experiment, the term "acute" is frequently used in referring to the effects of a single or, at most, a few repeated doses; the term "subacute" is used to refer to repeated exposures lasting three to six months; and the word "chronic" refers to exposures lasting somewhere between three months and the lifetime of the animal. These terms may be confusing inasmuch as the word "chronic" might well be used to refer to a persistent effect following a single dose. It is usually better to describe the duration of an experiment in terms of the actual duration; i.e., single dose, 90-day exposure, etc. For the purpose of predicting effects of industrial exposures, durations of six months or less are not infrequently all that is required.

Regardless of the type of exposure, ordinary clinical and pathological observations generally provide the most useful measure of biological effect. For example, with small species, such as the rat and mouse, a number of functions can be measured with considerable precision; e.g., growth or weight gain, food intake, hematological changes, and reproductive processes. The degree of skin or eye irritation can be graded in a roughly quantitative fashion; muscular activity and ability to do work can be measured.

Since many chemicals do not produce particularly characteristic clinical pictures, casual observations on behavior may not be very helpful at times, especially in small species. Nevertheless, the experienced toxicologist learns to recognize many characteristic clinical effects, such as stimulation of the autonomic nervous system by materials such as organic phosphates, the typical cyanotic appearance in light reflected from the eyes of rats with methemoglobin formation, anesthesia, increased reflexes, muscle weakness or fibrillation, pulmonary edema, hemorrhagic phenomena, and others.

Many of the clinical laboratory tests used in humans can be applied to animals. However, much experience with control animals is necessary, since they vary greatly from humans in normal values and in response to stress. The rat, for example, may have a normal white blood cell count of 20,000 with 80% lymphocytes, and a red cell count of 8,000,000. A 4+ cephalin flocculation reaction is normal in rats, as is albuminuria. With techniques such as those used by Gerarde,[14, 15] the effects of bone-marrow depressants, such as benzene, can be predicted with reliability. The rat also responds readily to materials producing hemorrhagic phenomena, methemoglobin, and cyanide-like effects. Many advances can be expected in the future as more study is given to the design of functional laboratory tests appropriate for various species.

Pharmacological methods have not been used as frequently by toxicologists as they deserve to be, although some progress is being made in this direction. It seems probable that, under the conditions of exposure likely to be encountered at present, a significant proportion of those chemicals which produce toxic effects may never cause any recognizable organic damage to cells, but, rather, produce reversible pharmacological effects which are expressed as symptoms such as headache, anorexia, sweating, or fatigue. Amdur[16] has demonstrated the effects of low levels of sulfur dioxide on pul-

monary flow resistance in guinea pigs, and Zapp[17] has studied the effects of certain chemicals on vascular patterns. Maze tests are coming into increased use, and there are reports from abroad of the use of conditioned reflexes as indicators of toxic effects.

Pathological studies have always been considered essential, but, as in the case of the clinical laboratory procedures, considerable training and experience are necessary to interpret the findings. Each species has its own characteristic pathologic response, which not only varies with age, sex, and genetic strain, but which also may differ from that of another species to the same type of stress. For example, the dog fed beta-naphthylamine may develop papilloma of the bladder, while the rat fed the same compound will develop tumors of the liver. The longer the experiment is continued, the more difficult it is to interpret the data, because of the profusion of pathologic conditions in old animals. Fortunately, many chemicals which produce authentic damage to tissues will do so relatively promptly with adequate dosage in studies such as those suggested by Fassett and Roudabush.[18]

One of the most sensitive indexes of effect has been found to be the weight of liver or kidneys in reference to body weight. An increased liver weight may be the only pathologic effect observed. Since this occurs many times with normal histology, it is probable that it represents a simple "work hypertrophy." In any pathology study it is desirable to measure liver, kidney. and possibly, other organ weights.

Biochemical methods are gradually becoming important to the toxicologist, particularly since the advent of new, extraordinarily powerful analytical tools. such as paper chromatography. These biochemical methods can be regarded as of two sorts: one concerned with the effects of the body on the chemical—e.g., absorption, distribution, metabolism, and excretion—and the other with the effects of the chemical or its metabolite on the body—e.g., the action of organic phosphates in phosphorylating cholinesterase, and the conversion of fluoroacetate to fluorocitrate with its disastrous effect on the Krebs cycle. Many componds will not have highly specific effects such as those just mentioned, but some effects on enzyme systems will be frequently found with substances of very high toxicity. While there are differences between man and animals in metabolism of chemical substances, the evidence now developing indicates that there are many similarities between species in the manner in which a variety of chemicals with similar structures are metabolized.

Once an analytical method of sufficient sensitivity has been developed to measure the concentration of a substance in expired air, blood, urine, or feces, it may become possible to relate exposure levels to concentrations in tissues or body fluids and, in some cases, to use such information as an index of exposure. Anyone interested in this approach should read the classical paper by Haggard[19] on the metabolism of acetone.

Evaluation of Data

The toxicologist evaluates his data and makes his prediction concerning the human hazard or safety by using two types of comparisons. The first is the comparison of treated with untreated groups. The second is the comparison of the new material with some similar material whose action in humans is known. While the latter may not always be possible, it is essential that any toxicology laboratory have comparative data on a wide variety of well-known industrial materials.

If the physician, for example, is given some data on a new chlorinated solvent, he should ask to see comparable data on a related material whose effect on humans is well known; e.g., carbon tetrachloride or methylene chloride. An excellent reference for the physician on the comparison of animal and human toxicity is contained in the article by Smyth.[20] Another valuable review on chronic toxicity testing is that by Barnes and Denz.[21]

Despite the many variables, it is possible to set certain benchmarks, or rather zones, which can indicate an order of potency of toxic effect from single exposures. For example, an oral LD_{50} of less than 50 mg/kg of body weight generally indicates classification as a highly toxic substance. Similarly, an LD_{50} of less than 1 gm/kg of body weight by a 24-hour skin application usually indicates definite skin absorption. In the case of inhalation studies, volatile materials having an LD_{50} of 2,000 ppm or less for four to six hours of a single exposure may be regarded as very active. These values, of course, are not sharp dividing lines but merely indicate an order of magnitude. Useful classifications of toxicities with numerous examples can be found in the article by Hodge and Sterner[22] and the range-finding studies by Smyth and associates.[23-28]

Important as it is to be able to classify chemicals according to their acute toxicity, it is equally important to recognize that there are materials, such as benzene, which have a rather low toxicity by single oral dose but which have a serious delayed effect on certain systems of the body. In other words, there is no necessary relationship between the potency of effect from single exposures and that from repeated ex-

posures. The problem of grouping materials as to potency of effect upon repeated exposure is even more difficult than in the case of single exposures, since more possible responses to injury are studied.

If it is assumed that the study has included sensitive indexes of response in the proper species, then some very rough generalizations may be made regarding daily dose or exposure and tendency toward cumulative effect. In the case of oral feeding to sensitive species for periods of three to six months, a number of materials known to produce pronounced cumulative effects in humans will be active in daily doses of well below 100 mg/kg, and freedom from cumulative effect is frequently found if daily doses greater than 1 gm/kg are tolerated.

In the case of absorption by daily skin contact for periods of a month, the same relationship of magnitude of daily doses and effects or lack of effects may be found, assuming that major local irritation is not present. For daily exposures to volatile solvents and gases of about three months' duration, materials with definite cumulative action may produce responses at 100 or 200 ppm or less, while relatively safe materials will often be tolerated at levels greater than 1,000 ppm, for a six- or seven-hour daily exposure. It is practically impossible to make any predictions regarding inhalation of dusts, since too many variables are present. The values suggested for repeated exposures are subject, of course, to great variation, but they are probably useful for orientation as to the order of magnitude at which significant cumulative responses are often found.

The physician who wishes to become more competent in toxicology might well start by making his own list of at least 15 or 20 chemicals, including some used in his own plant. The list should contain the physical properties of the substances, their current threshold limit, their toxic effects in man and animals, and the levels at which these occur. With this as a framework, he will soon find that new experimental data become more meaningful.

He should, whenever possible, develop quantitative estimates of human exposures and constantly try to compare data between species. This procedure is necessary even if no known toxic effects are observed in actual practice, since it is only by such comparisons that experimental data can be shown to have validity.

Dr. Fassett's address is Eastman Kodak Company, Rochester 4, N.Y.

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Conference of Industrial Medical Supervisors

The growing size and complexity of industrial medical organizations was reflected by a recent conference of industrial medical administrators, the first known meeting of such a group. A two-day session was held in Rochester, New York, on January 29-30, 1959. Eastman Kodak Company was host to the group which included administrators from five other U.S. companies.

Following an identification by each participant of his role and function in his specific organization, tours were conducted through the Medical Departments at Kodak Office and Kodak Park. The group then devoted its attention to such problems as budgeting, orientation and training of non-professional medical department personnel, organization and functions of medical department record systems, planning and construction of faciiities, and a variety of other activities of direct administrative and office management interest. For dinner and an informal evening discussion period, the group met with the Director of Industrial Relations and the Medical Directors of the Kodak units in Rochester.

Pictured are ROBERT F. CASE, Supervisor of Clinic Administration, General Electric Company, Schenectady, New York; GERARD J. CLIFFORD, Medical Administrator, Ford Motor Company, Dearborn, Michigan; RICHARD MACDIARMID, Medical Administrator, Standard Oil Company (N.J.), New York City; ARCH HARRIS, Administrative Assistant to the Kodak Park Medical Director, Eastman Kodak Company, Rochester, New York; ROBERT L. SMITH, Medical Administrator, International Business Machines Corporation, New York City; ROBERT S. ROSENBUSCH, Medical Business Manager, Chrysler Corporation, Detroit, Michigan; and THOMAS SPRENTALL, Medical Administrator, Eastman Kodak Company, Rochester, New York.

Topical Review

Occupational Anthrax in the United States

Charles E. Kendall, D.V.M., Pittsburgh

Source of Infection

Anthrax occurs in nearly all areas of the world in which well-developed animal disease control programs are lacking, with the heaviest areas of infection in the Mediterranean region, Africa, and Asia.[1-3] Ruminants form the most important host reservoir, but other animals—equine, porcine, canine, and feline—are affected; in the latter two types such infection is rare.[3] In ruminants and equine species the disease may appear in a peracute form in which the animal simply drops over and dies without prior signs. Generally the disease runs an acute course in these species, the picture being one of acute toxemia, with death in two or three days. The blood fails to clot properly, and rapid postmortem degeneration occurs. Bloody discharges from body openings are heavily contaminated with vegetative anthrax organisms, which develop into spores upon release from the host. In swine, which are more resistant, the usual picture is an elevated temperature, swellings in the neck area and death or recovery in 8 to 10 days. Dogs and cats are occasionally affected by ingestion of contaminated meats and when ill present a clinical appearance similar to that in swine, with the addition of a severe gastroenteritis. The vegetative form of the organism is rapidly destroyed in a decomposing carcass;[2] therefore the object of prevention is to avoid release of the vegetative form from the body to a location where it can sporulate. Such a spore form is extremely resistant and has been recovered up to 24 years after contamination of soil.[2] The disease is usually spread in one of six ways:

1. Soil, drinking water, or pasture plants may be contaminated with the body discharges of infected animals.[2]

2. Carnivores may drag a carcass along the ground and tear it open, exposing Bacillus anthracis to air. Spores may also be spread from the intestinal tract of such animals.[1, 2]

3. Scavenger birds may carry organisms on beaks or feet; and spores are discharged in feces, thus spreading organisms over long distances.[1, 2]

4. Flies, ticks, fleas, mosquitos, and other insects may transmit the spores.[2]

5. Spread along streams and waterways may occur.[2]

6. Contaminated animal products, such as bone meal or fertilizers, may cause spread.[1]

The control of zoonotic anthrax has been quite successful in the United States. This has been accomplished by cooperation among state and federal agencies, local veterinarians, and livestock producers. The important control points are the following: (1) immediate disposal of carcasses by (a) burning or (b) burial at least 6 feet deep, covering the carcass with quick lime; (2) examination for and treatment of early anthrax with anthrax antiserum plus heavy dosage of penicillin; (3) immediate change of pasture and subsequent plowing before reuse; (4) vaccination of well animals in herd; (5) strict quarantine (animals should not be moved or milk sold); (6) disinfection of premises. On the farm a 5% NaOH or 10% formalin solution is recommended. Despite the successful control of zoonotic anthrax in the United States, some endemic areas do exist. These are the Mississippi delta, the Great Plains states, central Texas, and some regions of California, Florida, Kansas, Missouri, New York, and Oklahoma. Outbreaks caused by imported bone meal for animal food have resulted in requirements that such products be sterilized prior to entering the United States.[5]

Unless anthrax is eliminated in domestic animals, it will inevitably be a potential hazard to persons occupationally exposed to such animals or their products.

Clinical Considerations

In humans, anthrax in the United States is largely limited (97% of the cases in one study) to the cutaneous disease. Inhalation anthrax

Dr. Kendall is associated with the Graduate School of Public Health, University of Pittsburgh.

accounts for most of the other cases, while intestinal anthrax from ingestion of spores is extremely rare. Parenthetically, it may be noted here that the resistance of anthrax spores is such that they would not be destroyed by boiling or cooking or by pasteurization.[6] The sites of cutaneous infection were listed in one study of 72 cases[7] as hand and forearm cases, 48.6%; face and neck, 33.3%; chest, 11.1%; and other parts of body, 7.0%. From this study as well as others has come the observation that anthrax attacks most frequently those parts of the body unprotected by clothing or gloves.[7]

The disability which results from anthrax may vary from one to two weeks for a cutaneous lesion when diagnosed early and treated with antibiotics to septicemia and death in the inhalation form of the disease.

Recent work has shed much light on the pathogenesis of anthrax. A thermolabile toxin has been identified both in vivo and in vitro. The role of aggressins produced by the organism has been studied. The cause of death from anthrax appears to be due to elaboration of toxin which damages capillaries, allowing extensive leakage which leads to a secondary shock syndrome.[8]

Distribution of Reported Cases of Human Anthrax

In this country the occupational hazard from anthrax is largely limited to those occupations in which there is handling of imported goat hair, wool, and hides (Table I). Thus such workers as longshoremen, freight handlers, warehousemen, and employees of goat hair, wool, and hide processing industries are most affected. From 1939-49, 80% of cases reported in the United States were industrial, 14.5% agricultural, and 5.5% listed as "unknown" or "other" in origin.[10] Of the industrial cases about 90% are found to occur in workers exposed to carpet wools, which are coarse grades of wool produced mainly in heavily infested anthrax areas, or to goat hair or skins imported from areas where anthrax is prevalent.[10] Of this group, those who work with fresh dried hides, received in bales (usually uncertified hides from China or India) before they are immersed in the solutions of lime or formaldehyde used to destroy the anthrax spores, are most exposed in the leather manufacturing industry.[9]

Of the cases caused by animal fiber in the period 1934-1949, 76% were due to contaminated wool and 24% to contaminated hair.[11] The 76% associated with wool were correlated with coarse grades of wool, of which 43,000,000 pounds were used annually in carpet manufacture and 1,000,000 pounds in apparel manufacture during the 1940-1949 decade.[11] Of the cases related to contact with hair, 90% were ascribed to goat hair exposure and nearly all could be traced to hair originating in India or Pakistan.

Table I—Workers with a Potential Exposure to Anthrax Infection[9]

Blanket makers	Longshoremen
Brushmakers	Mattress makers
Butchers	Ranchmen
Carpet makers	Shoemakers
Cloth makers	Slaughtermen
Dairyworkers	Tanners
Furriers	Upholsterers
Hair curlers, sorters, and dressers	Warehousemen
Herders	Wool sorters

*Table II—Distribution of Anthrax in the United States by Source of Infection**

	Percentage of Reported Cases Traced to Source				
Source	1919-1923	1924-1928	1929-1933	1934-1938	1955-1956
Hides and skins	53	38	30	35	2
Wool	3	25	27	15	9
Goat hair	12	9	4	5	65
Agriculture	13	14	26	34	21
Shaving brushes	18	4	2	2	0
Laboratory	—	2	3	2	0

*Adopted from Wolff and Heiman (1951) by Brachman and Fekety.[12]

The distribution of cases throughout the industries involved has undergone a marked change, and new cases are predominantly associated with goat hair exposures. At present 40 to 50 cases of anthrax are reported annually, and approximately 80% of these are of industrial origin, the majority arising in industry which uses goat hair[12] (Table II).

Within the wool and hair processing industries no group of workers, with the possible exception of office workers, can be said to be entirely safe. A correlation seems to exist between the kind of work done in the plant and the incidence of anthrax in the hair industry, the danger of contracting anthrax being greatest in the earliest stages of the processing.

A breakdown, by departments, of anthrax cases occurring in three goat hair mills (1945-1956) shows cases per 100 employees per year as follows: picking, 44; carding, 4.4; combing, 4.0; drawing, 3.0; spinning, 2.2; weaving, 0.2; finishing, 0.8; office, 0.0.

Occupational Factors Favoring Infection

Factors in the plant environment which favor effective contact of the worker with the organism are listed by Purdom and Werrin[7, 13] as follows. These are based on the assumption that unsterilized animal products are present in the plant and that the plant processes favor the creation of air-borne dust contaminated with anthrax spores.

1. Faulty ventilation, permitting general contamination of the plant premises.

2. Poor lighting, which favors poor house keeping.

3. Conditions favoring breaks in contaminated skin surfaces: (a) personal uncleanliness, and environmental heat with resulting sweating, resulting in itching which stimulates scratching; (b) contaminated clothing in association with the foregoing conditions; (c) plant conditions or job practices that favor production of minor skin cuts.

4. Failure to provide prompt and adequate treatment of minor skin injuries.

Control Measures

Measures which are suggested to reduce the incidence of anthrax in the United States might be listed as follows:

1. International cooperation in lowering the incidence of anthrax in endemic areas. This is the best ultimate control but is apparently impractical at the present time.

2. Sterilization of animal products in endemic areas before they enter the United States. There is no satisfactory means available for disinfecting hides at the present time. Wool and hair products, however, could be disinfected at the source as a satisfactory process is available. The countries of origin could not afford the initial investment and cost of the process, and so the practicability of this appears doubtful at present.[11] Some products, such as bone meal, lend themselves fairly easily to disinfection, and in this respect control is accomplished.

3. Sterilization of animal products from endemic areas at ports of entry into the United States. Here again we find economics playing a role. The Duckering process, which is used on all hair and wool entering Liverpool, England from endemic areas could be applied with equal success in the United States, but the initial cost would be several million dollars and would raise the price of processed materials 5 to 10 cents per pound.[10] This would result in a loss of commerce to ports which did not have the disinfection station, because such a station would have to be centralized. Therefore, this process seems not to be applicable in the United States.

4. Sterilization of hair and wool from endemic areas as it enters the individual plant, before processing occurs. This might be possible but, again, would raise the cost of wool several cents per pound and would be impractical because of competition from other fibers for the wool products market.[14] As a result of strong cost competition synthetic fabrics have made considerable inroads on the market for wool. The prospect of additional cost to sterilize the wool and hair could cause an increased conversion to other fibers. This would certainly reduce exposure to anthrax in the United States.[12]

5. The next consideration might be that of improving conditions of work at plants to reduce exposure and prevent serious consequences when exposure occurs. Such a program would have three aspects: plant environmental control, protective personal equipment, and medical care within the plant and surrounding area. (a) In the plant environment, control of air-borne contamination is the key. Application of the following general categories of control are valuable:[14] (1) change of process, (2) enclosure, (3) isolation, (4) dilution, (5) local exhaust, and (6) housekeeping. (b) Personal protective equipment refers primarily to adequate body coverage. Loose fitting coveralls, long sleeves, gloves, and hats are recommended. Boots and aprons impervious to water should be available for workers in wet processes. Respirators may be necessary in some dusty operations. Two lockers should be available for each worker: one for street clothes and one for work clothes. Arrangements for laundering of work clothes should be made by the management and not entrusted to workers. Workers should be required to take showers and change to street clothes before leaving the factory.[15] (c) Medical care in the plant may be provided by a full-time or part-time physician or one who is on an "on call" basis, depending upon the size of the control problem. The physician should acquaint himself with all conditions in the plant and have a knowledge of the methods of treatment for the specific illnesses which occur. He should also be consulted on other phases of the protection program. The installation and maintenance of adequate first-aid facilities should be under his supervision, together with training of first-aid personnel. The indoctrination of the plant employees on the cause and nature of anthrax lies with the medical department. The use of preemployment and periodic physical examinations is of paramount importance, for persons in poor health are susceptible to any infection in addition to anthrax. The physician's most important responsibility in the

control of anthrax is that he should demand that all suspicion-arousing lesions be reported to him immediately. Moreover, he should have an understanding of government regulations regarding the treatment, disposition, and reporting of communicable disease cases.[13]

6. The last consideration might be that of changing the host resistance to the organism by means of a vaccine. Many vaccines for anthrax have been produced. All have had disadvantages which have precluded their widespread use. Research for the armed forces at Camp Detrick, Md., has resulted in a process for more successful antigen production but this is not presently available commercially, although field testing of this material in some mills has been reported.[12, 16] If a vaccine of high potency with few drawbacks were available for use in identified high-risk groups it would certainly lower the incidence of infection.

Summary

The following points about occupational anthrax are presented and summarized: the natural disease; its zoonotic occurrence; means of prevention at the source and the success of such a program in the United States; the sources of infection for the United States; those occupations most affected; plant conditions leading to infection; and useful precautions which may be taken to reduce the incidence of the disease.

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Dr. Kendall's address is Graduate School of Public Health, University of Pittsburgh.

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Editorials

Heart Disease and Employment

On a theoretical basis there are three possible relationships between the stresses of employment and heart disease: two negative and one positive. In the negative relationships the the stresses of employment either would cause heart disease or would aggravate existing cases. In the positive relationship, employment stresses would result in a beneficial effect. The negative relationships have been assumed as a matter of course with respect to heart disease of all types and all degrees of severity. Only recently has there been some support of the opposing view, that stresses of employment might be therapeutically useful to the heart disease patient.

To hold an opinion on questions of this kind is one thing. To establish incontrovertible proof is quite another. Production of the quality of proof demanded of the researcher in the natural sciences would require for the present problem an experimental design that must be rejected on ethical and moral grounds. At such a level of research it would be necessary to develop matched populations with and without heart disease. These would be divided into groups that would perform precisely known amounts of work, and all groups would be followed forward in time to the autopsy table. With groups of adequate size and observations of excellent quality it should be possible to produce data that would lead to a dependable answer.

In the absence of an experimental method we resort to such observations as can be made of people with and without heart disease in the normal course of their lives. An elementary question in the whole matter relates to the number of cases of heart disease that exist among people of working age at a given time—in the epidemiologist's term, the prevalence of the condition. The studies reviewed by Tauber in his article elsewhere in this issue showed that in a representative sample of a large section of Pittsburgh the prevalence of heart disease among persons 15 years of age and older is about 14%. Among males in the age group 15-64 years inclusive, the value is about 9%; among males 45-65 years of age, about 21%; and among persons of both sexes who are employed in the sense that they work for wages, the prevalence in the age group 15-64 years is about 8%. Admittedly, most of these cases were discovered by specialized diagnostic procedures not ordinarily used in the examination of presumably well people. Nevertheless, the results demonstrate that the heart disease problem involves a substantial proportion of the total population, and there should be opportunities to observe the influence of work upon the condition.

The type of study begun by Goldwater and his associates in New York, in the comprehensive evaluation of the person with heart disease with respect to his employability, have shown that most such persons can be gainfully employed without detriment to themselves. This conclusion is being widely supported by experiences in similar studies at various cardiac work evaluation clinics underwritten by units of the American Heart Association. The observations of Price, also reported in this issue, support the growing awareness that coronary heart disease with myocardial infarction has a very broad severity spectrum, ranging from events that cause virtually no symptoms or disability to instantaneous catastrophe. Within this broad spectrum are cases of varying severity that are compatible with continued, gainful employment. There is, then, "proof" of a sort, that within reasonably definable limits, the stresses of employment do not aggravate existing cases of heart disease; and a reasonable extension of this conclusion would hold that the stresses of employment do not cause the condition. There is, in fact, a growing belief that physical stress, whether or not associated with employment, may have a deterrent effect upon the develop-

ment of myocardial infarction and a beneficial effect upon cases in which there has been recovery from the effects of the acute episode.

Present day barriers to the useful and possibly beneficial employment of a large number of persons with some form of heart disease are legal and social, as distinct from scientific, in nature. The situation was briefly referred to by Joseph L. Block, Chairman of the Board of Inland Steel Company, in a recent address in Chicago.* In more specific terms than were used by him, the laudable practice of workmen's compensation boards to rule in favor of the worker when there is a reasonable doubt as to cause is leading gradually but certainly to the practice of finding an industrial cause or aggravating factor for every unfavorable event in the natural course of every kind of heart disease among industrial employees. A second problem is the restriction of placement imposed by unions in their determination to support rigid job seniority provisions in their contracts, frequently precluding thereby the assignment to a suitable job of a person whose work capacity is limited by heart disease. Thus it turns out, ironically, that two basic building blocks in the security of wage earners, workmen's compensation benefits and job seniority, have become barriers to the gainful employment of a large number of idle workers who should have jobs.

It would be illogical to expect that problems which are essentially social can be corrected by research which is essentially scientific. But it is not wrong to hope that those with the power and capacity to correct this social problem will do their best to understand what present day researches reveal and to make constructive use of the new knowledge.

*Block, Joseph L.: Management Looks at the Worker with Heart Disease. Address before the Sixth Annual Heart-in-Industry Conference, Chicago, Nov. 14, 1958.

Council on Industrial Health

The nineteenth Annual Congress on Industrial Health recently held at Cincinnati has served to focus our attention again upon the American Medical Association's Council on Industrial Health. Ordinarily a quietly operating group of industrial physicians, within the administrative vastness of AMA, the Council annually uses its Congress to publicize its accomplishments and the direction of its work. These occasions, together with formal reports and statements which are issued from time to time, reveal an activity which is great as regards both quantity and effectiveness.

In the best recollection of a relative outsider the Council was created in the middle thirties to serve a watchdog function. Industrial practice then was changing rapidly from the limited activity of treating the occupationally injured to the provision of in-plant health programs that were developing under the stimulus of newly enacted occupational diseases laws in the heavily industrialized states. It was the Council's original mission to study and understand these changes and to interpret them for the policy makers of AMA. Under the quiet leadership of the late Dr. Carl M. Peterson the mission was expanded and, indeed, somewhat reversed. The organization and communication lines of AMA were used to elevate the standards of the new field of practice, and efforts were made to gain acceptance within the parent organization of the concepts upon which the new field was necessarily based. When the right time came, the Council was in a key position to expedite and channel the drive for specialty recognition of occupational medicine within the field of preventive medicine.

The program of the Cincinnati meeting, under the general direction of Dr. Robert A. Kehoe, had the theme Occupational Medicine in Action. The aspects of action displayed in open programs dealt with education, research, and practice. Action was presumably discussed as well at nonprogrammed sessions of the Council under the chairmanship of Dr. William P. Shepard. In the present dynamism of the social and political context within which medical practice must be carried on, there are certain familiar questions which take on new urgency. What is the extent to which care of nonoccupational disability should be carried in an in-plant medical program? What sorts of problems are created and what sorts are solved by allowing free choice of physicians in cases of occupational injury or disease? These and others will engage the best efforts of the able men who comprise the present Council. We can all be certain that these efforts will be characterized by dedicated energy, great ability, and real wisdom.

Industrial Medical Association

THE PRESIDENT'S MESSAGE

H. W. LAWRENCE, M.D.

HI HO! Come to the Industrial Health Fair! The biggest, most colorful annual gathering in the world of industrial health, with its many facets, takes place at the Hotel Sherman in Chicago the last week of April. Again the five participating associations (IMA, AAIN, ACGIH, AIHA and AAID) exchange their wares in the form of scientific papers and exhibits and informal barterings of experiences and notes. An abundance of spectacular and informative commercial exhibits, too, are on display. All in all, the 1959 Conference looks as if it may be the largest in our history.

Drs. Arthur Peterson, Eugene Walsh, and their Chicago colleagues have made a concerted effort to utilize IMA standing scientific committees to bring you some of the fruits of their efforts. You will note in the preliminary program such varied discussions as those by Dr. Robson's Committee on Geriatrics and Retirement and Dr. Caldwell's Committee on Mental Health combining to look at the older worker and his problems in respect to retirement. Then, Dr. Barnes' Committee on Medical Care gives you a look into the most sensitive topic in medical policy today—medical care plans. Four different types will be paraded before you for your information and judgment. Later in the morning, another timely and newsworthy group of topics relative to ionizing radiation and chronic chest diseases will be presented jointly by the committees of Drs. Norwood and Tebrock.

On Thursday morning Dr. Jellema's Committee on Problem Drinking takes a fresh look at this always present and disturbing issue. One of the harder working groups in our Association is Dr. Brandaleone's Committee on Standards for Vehicle Driving. They review some new medical aspects of accident prevention. Again and again the problem of industrial health care for the small plant appears on the top of "what's needed" lists in our field. Dr. Robertson's committee not only presents aspects of this on the program but has worked on a brochure and a scientific exhibit.

Now for other highlights in the IMA program—the first morning's clinics St. Luke's and Cook County Hospitals are sure to attract those of us with surgical problems. The rehabilitation clinic at Dr. Michela's Institute will demonstrate to us ways and means to bring our people back sooner and more effectively to their jobs.

A major highlight of the opening session Tuesday afternoon will be the presentation of the coveted Sappington Memorial Lecture by Dr. Carey P. McCord, long the distinguished elder statesman of our Association. Twenty-four hours later, Dr. Louis N. Katz gives us a timely discourse on arteriosclerosis and coronary disease, the fruits of his group's long years of productive research.

On Wednesday afternoon the annual business meeting with its ceremonious awarding of fellowships and election of officers and directors brings the Association's year to a close. A new one begins at the annual banquet that evening. Our annual dinner this year takes on special interest and sentiment, for it will be dedicated to Dr. Edward C. Holmblad upon his retirement from the many active years of guiding the IMA.

The total program combines medical and surgical subjects of all kinds, broad views into toxicological problems, and specific pinpointing of others. There are a great number of papers on all aspects of our field from the points of view of the chemist, the engineer, the nurse, and others, on the program of our co-sponsoring, associate organizations. In a word, there is much for everyone!

Book Reviews

GUIDE TO RUSSIAN MEDICAL LITERATURE. Edited by Scott Adams and F. B. Rogers. National Library of Medicine, Public Health Service Publication No. 602. Price, not given. Pp. 90. Washington, D.C., Government Printing Office, 1958.

There has often been a tendency to by-pass Russian contributions when surveying the medical literature of the world. Several factors are involved, such as the linguistic barrier and the lack of cumulative indexes. Although Russian literature is still difficult to search and obtain, many forces have been at work in recent years to make this wealth of material available to the western world. The "Guide to Russian Medical Literature" is the result of a concerted effort on the part of the National Library of Medicine and the National Institutes of Health to make known the scope and accessibility of Soviet publication in this field. The editors have called upon the knowledge and experience of some individuals well qualified in the field of library science to compile a compact handbook for the purpose of aiding physicians and librarians who are interested in obtaining information on developments in Russian medicine. It is not meant to be a comprehensive manual, but simply an overview of medical publishing activity in the Soviet Union, and as such, fills a definite need long awaited by those engaged in bibliography and research.

The editors have provided specific data concerning translation and abstracting services. Journals now available in cover-to-cover translation are listed, and details on the acquisition of translations of single articles and monographs are supplied. Pertinent information on bibliographic sources—both in Russia and in the west—is presented. Definite directions are given for obtaining journal articles and monographs either in the original or in translation. One section is devoted to a suggested method of conducting a literature search in order to obtain maximum results from the sources available at the present time.

Since World War II there has been on upsurge of interest in the published output of scientific thought and research in the Soviet Union. Such increasing activity cannot be ignored in the world today, despite the difficulties incurred in undertaking a survey in any given subject.

It is perhaps significant that the United States Senate became aware of this fact, and in 1956 the Appropriations Committee was responsible for instigating the National Institutes of Health to establish the Russian Scientific Translation Program. The main objective of the program, as stated by the editors, is to provide "American scientific professions with information on the full findings of Russian medical research." It is admittedly a monumental task, but the work is going forward and great strides are being made.

Both private enterprise and government agencies are now engaged in disseminating essential information, and this guide points to the direction this activity is taking. That it will increase in the future is inevitable if there is to be continuity in international communication in the medical sciences.

Science is universal and since world medical literature is incomplete without consideration of the results of medical investigation in the Soviet Union, the "Guide to Russian Medical Literature" should be of invaluable assistance to those engaged in medical research and to those who compile bibliographies.

RALPH SCHNEIDER, M.D.

THE INDUSTRIAL ENVIRONMENT—ITS EVALUATION AND CONTROL. Prepared by U. S. Public Health Service, Occupational Health Field Headquarters, Cincinnati. Obtainable through Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price $2.75. Public Health Service Publication #614.

Since 1953 the Occupational Health Field Headquarters unit has been offering a two-week basic training course for industrial hygiene engineers and chemists. Throughout these years specific reference materials, lectures, tables, problems, and procedures were developed to the point where the staff was of the opinion that this material should be drawn together in a systematic and orderly manner for use in future classes and also to be generally available to others not attending such classes. The net result is the present publication, in the form of multilithed sheets with plastic ring binder.

In the foreword of this publication one finds a definitive statement of the purpose of the course or of this publication. "It is intended (1) in the case of newcomers to the field, to provide guidance which will start them in the proper direction towards the achievement of competence, and (2) in the case of more experienced workers, to furnish an opportunity to review basic procedures and techniques, and to compare and exchange experiences and information."

The syllabus is divided into four major sections In Section A one finds a lucid presentation of general principles in evaluating the environment. This is followed in Section B, by a terse, encyclopedic type of review of sampling instruments used for the collection of air-borne material. Section C is primarily devoted to the problems of engineering control of the occupational environment. The laboratory procedures, analysis of samples, and calibration of field and laboratory instruments are discussed in Section D. These sections account for approximately 200 typewritten pages (multilithed) of essential data pertaining to the specific section subjects.

Because of the general excellence of the assembled material, it is rather difficult to select any one subject as worthy of special note. However, this reviewer was impressed with the outstanding clarity with which the subject of sound and noise was pre-

sented. This is a rare accomplishment in the field of scientific writing.

Specifically omitted from the publication are subjects dealing with the clinical, toxicological, and physiological aspects of occupational health hazards. On this point the editors comment. "Such subject matter would need to be given in considerable detail in order to be useful for reference purpose."

This publication can well serve as a basic handbook for most industrial hygiene engineers and chemists. Physicians reading it will develop a deeper appreciation of the scientific skills that chemists and engineers must master in order to aid the physician in evaluating the industrial environment.

LOUIS W. SPOLYAR, M.D.

Letters

TO THE EDITOR: The informative article, "Present Position of Government in Occupational Health," by Seward E. Miller, M.D., in the January, 1959, issue of the JOURNAL OF OCCUPATIONAL MEDICINE, page 29, contains a reference to the Army Environmental Health Laboratory which may be misleading.

I believe Dr. Miller meant to credit the Chemical Warfare Laboratory, Army Chemical Center, Maryland, an activity of the Chief Chemical Officer with doing the research he mentions.

On the other hand, the Army Environmental Health Laboratory, also at Army Chemical Center, Maryland, is under the staff supervision of The Surgeon General, Department of the Army. This laboratory directly supports the Army Occupational Health Program, providing assistance to all Army installations by conducting industrial hygiene surveys, supplying consultations in occupational medicine, sanitary engineering, ventilation engineering, radiological hygiene, chemistry, toxicology and entomology.

I am sure Dr. Miller did not wish to create the impression that U. S. Army Environmental Health Laboratory and the Chemical Warfare Laboratory are one and the same.

CHARLES W. KRAUL
Lt. Colonel, MC
Chief, Occupational Health Branch
Preventive Medicine Division
Department of the Army
Washington 25, D. C.

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Abstracts of Current Literature

Internal Medicine

Shermer H. Stradley, Jr., M.D.

Diabetic Neuropathy Presenting as the Initial Clinical Manifestation of Diabetes. Max Ellenberg. Ann. Int. Med. 49:620 (Sept.) 1958. (*The Mount Sinai Hospital, New York.)

The assumption and teaching have been that diabetic neuropathy follows a prolonged period of poor diabetic control. Appreciation of the fact that neuropathy may be the initial clinical manifestation of diabetes is of practical importance. Illustrative cases are presented in detail. The observations of the author indicate that neuropathy is not a complication, but is an integral part of the syndrome of diabetes mellitus. Neuropathy, as a presenting symptom in a patient with a family history of diabetes, demands investigation for the possibility of diabetes in the patient. It is emphasized that a determination of fasting blood sugar is inadequate, as a normal value results in unwarranted security and discarding of the diagnosis. As a screening test, the two hour postprandial blood sugar level is satisfactory, but this should be followed by a glucose tolerance test when indicated. This approach will resolve the true diagnosis in some cases which would otherwise be classified as "idiopathic" neuropathy.

The neuropathy may manifest itself in several ways. One patient presented with an isolated third nerve paralysis; another, with symmetric weakness of all four extremities, absence of deep reflexes, paresthesias, and some atrophy of the small muscles of the hands, along with anorexia, weight loss, and depression.

Clinical Experiences with Kanamycin. P. A. Bunn* and A. Baltch. New Eng. J. Med. 259:659-662 (Oct.) 1958. (*State University of New York Upstate Medical School, Syracuse, N. Y.)

Kanamycin is a new antimicrobial agent currently being used for two types of infection: (1) those due to penicillin-resistant staphylococci and (2) those due to a number of common Gram-negative bacilli. Preliminary results of therapy are encouraging, as to efficacy and toxicity. Thus far, toxicity appeared to be minimal when intramuscular therapy was used for short periods, the daily dose being 2 to 3 gm for 4 to 14 days. Smaller daily doses (0.25 to 1.0 gm) for prolonged periods caused undesirable effects in nearly all patients, such as hyaline and granular casts in the urine and toxic effects on the eighth cranial nerve.

In vitro, Kanamycin inhibits staphylococci, most strains of Proteus and Klebsiella, tubercle bacilli, and some strains of Pseudomonas, and Aerobacter aerogenes. It is impressive that streptomycin-resistant strains of Escherichia coli were nearly always inhibited. Most pyocyaneus organisms are resistant, as are some strains of Proteus. There was not sufficient inhibition of growth of beta-hemolytic streptococci or pneumococci to warrant use of the drug in such infections.

Unsuspected Diabetes Mellitus in Peripheral Vascular Disease. C. C. Bartels* and F. R. Rullo. New England J. Med. 259:633 (Sept. 25) 1958. (*Lahey Clinic, Boston.)

The association of peripheral vascular disease with diabetes mellitus is well established. Less well appreciated is the frequency of abnormal glucose tolerance in patients with verified peripheral vascular disease with no previous evidence of diabetes. This is a report of 100 consecutive unselected ambulatory patients whose presenting symptom was that of peripheral vascular disease of the lower extremities—namely claudication pain. Some also complained of paresthesia and rest-pain; others presented with nonhealing ulcers and gangrene. Absence of one or more pulses in the lower extremities was noted in all cases. Two techniques of blood sugar determinations were used: the Folin-Wu and the true blood sugar determination. One hundred grams of glucose was given orally, fasting, or more than two hours after eating. Determinations were made at one-half hour, one hour and two hours. Levels of 200 mg per milliliter or more in one hour and 140 mg or more in two hours was considered abnormal by the Folin-Wu method; 170 mg per milliliter or more after one hour, and 120 mg per ml. or more after two hours was considered abnormal by the true blood sugar technique. Twenty per cent of the patients had definite evidence of diabetes mellitus. Only 23% of the entire group showed normal results in all aspects of the glucose tolerance test. It is concluded that diabetes mellitus should be excluded in all patients with evidence of peripheral vascular disease.

Treatment of Recurrent Styes. P. W. Monckton Copeman.* Lancet 2:728-729 (Oct. 4) 1958. (*Eye Department, St. Thomas's Hospital, London.)

Over 90% of patients with recurrent sties were found to carry Staphylococcus aureus in the anterior nares. Recurrent sties have presented a difficult therapeutic problem. This type of sty may be so severe and frequent as to be partially disabling, in contrast to the sporadically occurring sty which is self-limited and of minor importance. Treatment consisted of the application of an antibiotic ointment. A neomycin-bacitracin combination proved to be the most effective. Treatment of the nares alone is usually sufficient, but it is logical to treat the sty itself also, to avoid transference of infection. The ointment should be applied to the eyelids and to the anterior nares four times daily for 10 days, followed at two-weekly intervals by courses of 7

Abstracts

days' treatment. The patients' bedding and clothing should be thoroughly cleaned to reduce recontamination. Such a regimen can be expected to interrupt bouts of recurrent sties.

Experimental Toxicology

Robert E. Eckardt, Ph.D., M.D.
and B. E. Bennison, M.D., M.P.H.

Studies on the Acute and Subacute Toxicity of Bis(2-Ethyl-hexyl) Hydrogen Phosphite. M. H. Joffe,* L. E. Congwer, and C. L. Punte. A.M.A. Arch. Indust. Health 18:464 (Dec.) 1958. (*Army Chemical Center, Md.)

Rabbits exposed cutaneously to lethal doses (2 ml/kg) showed a posterior limb paralysis 6 to 48 hours after exposure. This paralysis was followed by prostration, lack of desire for food or water, and death 24 to 48 hours later. There were no signs other than quiet lassitude connected with death. The skin test area became darkened and parchment-like. Microscopically a coagulative necrosis of the epidermis, extending into the dermis, was seen. In addition, 50% of the rabbits showed an ulceration of the stomach. These skin effects were confirmed on humans who developed similar dermatitis during the course of the experiments.

Nickel Poisoning: VI. A Note Concerning the Ineffectiveness of Edathamil Calcium-Disodium (Calcium Disodium Ethylenediaminetetraacetic Acid). B. West* and W. F. Sunderman. A.M.A. Arch. Indust. Med. 18:480 (Dec.) 1958. (*Research Associate, Rohm & Haas Co., Philadelphia.)

In mice previously exposed for 30 minutes to 0.06 mg/liter of nickel carbonyl, edathamil calcium-disodium (calcium disodium EDTA) provided no protection. Mortality, distribution of nickel in tissues, and urinary nickel values did not differ significantly from findings in the positive controls in these tests.

Experimental Epidemiology of Chronic Sodium Chloride Toxicity and the Protective Effect of Potassium Chloride. G. R. Meneely* and C. O. T. Ball. Am. J. Med. 25:713 (Nov.) 1958. (*Vanderbilt University School of Medicine, Nashville, Tenn.)

A series of feeding experiments are reported in rats which indicate that 0.01% NaCl in the diet is suboptimal, 0.15%-2.0% is optimal, and 14%-21% is shortly lethal. As dietary NaCl is increased from 0.15% to 9.8%, food consumption increases at the higher levels, water consumption (and urine output) is essentially proportional to NaCl intake and growth inversely proportional. A curious nephrosis-like syndrome occurs sporadically among rats on 7.0% NaCl diets and above. This is characterized by an abrupt and massive edema, hypertension, hyperlipemia, hyperproteinemia, and azotemia. Hypertension is present at dietary levels of 7.0% NaCl and above, in both young and old rats, although the older ones seemed less susceptible, as were the females. The incidence of electrocardiographic abnormalities, similar to those in human hypertensives, is directly proportional to NaCl intake. Serum cholesterol increased with increasing NaCl intake but correlated better with blood pressure levels. Survival rates were sharply curtailed with increasing NaCl levels. Heart and kidney weights increased with NaCl levels, and adrenal weight increased with increasing levels above 9.8% NaCl. Microscopic examination revealed a disorder primarily affecting the arterioles and small arteries, seen most strikingly in the kidney and parenchymatous organs. A striking increase in survival was obtained when rats on the 5.6% NaCl diet were supplemented with 2.9% KCl and in those on the 8.4% NaCl diet supplemented with 4.7% KCl. The moderate hypertension seen in the rats on the lower NaCl diet was not influenced by added KCl, but the severe hypertension in the rats on the 8.4% NaCl diet was reduced to a moderate degree by the added KCl.

Potentiation of the Toxicity of Insecticidal Organic Phosphates. K. P. Dubois.* A.M.A. Arch. Indust. Health 18:488 (Dec.) 1958. (*Department of Pharmacology, University of Chicago.)

Combinations of compounds which exhibit no potentiation acutely will not produce the effect in lower doses. The potentiation which occurs with acute dosages does not necessarily occur with subacute doses, and it definitely will not occur at the very low residue levels permitted on food crops. This potentiating effect occurs when one compound interferes with the enzymatic detoxification of another by inhibiting an esterase in liver, serum, and other tissues. Other agents in the environment may inhibit the detoxification of organic phosphates, and also organic phosphates may render people hypersensitive to ester-type drugs by inhibiting their detoxification.

Biochemical Alterations of Liver Function by the Halogenated Hydrocarbons: I. In Vitro and in Vivo Changes and Their Modifications by Ethylenediamine Tetraacetate. D. N. Calvert* and T. M. Brody. J. Pharmacol. & Exper. Therap. 124: 273 (Dec.), 1958. (*University of Michigan Medical School, Ann Arbor.)

Liver mitochondria treated with CCl_4 in vivo and in vitro show loss of diphosphopyridine nucleotide (DPN) linked activity. Also, oxidative phosphorylation is inhibited, probably the result of magnesium adenosinetriphosphate activation. The oxidation of choline is enhanced. In addition, with oral administration, changes from normal were seen in tissue sodium and potassium concentrations and in serum glutamic-oxaloacetic transaminase activity. Simultaneous administration of Versene blocked the oxidation and phosphorylation effects and modified changes in ion content and transaminase activity. Choline ad-

ministration did not prevent enzymatic changes produced by CCl_4; rather it seemed to increase depression of functional activity. Versene may protect in two ways: by some effect on the membrane of the mitochondria and by binding magnesium and calcium.

Acute Effects of Nitro-Olefins upon Experimental Animals: Preliminary Report. W. B. Deichmann,* M. L. Keplinger, and G. E. Lanier. A.M.A. Arch. Indust. Health 18:312 (Oct.) 1958. (*University of Miami School of Medicine, Coral Gables, Fla.)

Vapor inhalation effects; acute oral, intraperitoneal, and cutaneous toxicity; local effects on the rabbit eye; and effects on blood pressure and respiration were determined for the following 12 nitro-olefins; 2-nitro-2-butene; 2-nitro-2-pentene; 3-nitro-3-pentene; 2-nitro-2-hexene; 3-nitro-3-hexene; 2-nitro-2-heptene; 3-nitro-3- heptene; 3-nitro-2-octene; 3-nitro-3-octene; 2-nitro-2-octene; 2-nitro-2-nonene; and 3-nitro-3-nonene. All are toxic and produce marked local changes in the skin and enteric tract. The vapors cause marked irritation of the entire respiratory tract, skin, and eyes. Absorption from the respiratory or gastroenteric tract, peritoneal cavity, or skin is very rapid, and evidence of systemic intoxication appears rapidly, including hyperexcitability, tremors, clonic convulsions, tachycardia, and increased rate and magnitude of respiration, followed by a generalized depression, ataxia, cyanosis, and dyspnea. Death is initiated by respiratory failure and associated with asyphyxial convulsions. Pathological conditions were most marked in the lungs regardless of the mode of administration. Deaths in rats, rabbits, and chickens occurred after five-hour vapor exposures to concentrations ranging from 43 to 1400 ppm, although, in general, lethal concentrations were less than 300 to 500 ppm. The approximate lethal dose ranged from 0.28 to 2.1 gm/kg for oral administration in rats, from 0.05 to 0.42 gm/kg via the intraperitoneal route in rats, and from 0.42 to 1.40 gm/kg by cutaneous absorption in rabbits. Toxicity seems to decrease with increasing chain length by all but the cutaneous route. It is suggested that factors such as rate of absorption and volatility might explain the apparent decrease in toxicity of compounds containing up to six carbons and increase thereafter up to nine carbons via the skin absorption route. The nitro-olefins are under study because of their presence in Los Angeles atmosphere at concentrations of 10 to 15 ppb and their possible role in the observed effects of LA smog.

Experimental Studies in Metal Cancerigenesis: X. Cancerigenic Effects of Chromite Ore Roast Deposited in Muscle Tissue and Pleural Cavity of Rats. W. C. Hueper.* A.M.A. Arch. Indust. Health 18:284 (Oct.) 1958. (National Cancer Institute, Bethesda, Md.)

In 2 of 25 rats which received pleural cavity implants of chromite ore roast mixed with sheep fat, squamous-cell carcinoma coexistent with sarcoma of the lung developed after two years. Of 31 rats which received right thigh muscle implants of the same material, 3 developed fibrosarcoma of the thigh, the first appearing after 10 to 12 months. These findings are interpreted as evidence for a carcinogenic agent in chromite ore roast, described as containing "various chromium compounds formed during the roasting process from powdered chromite ore mixed with soda and liver from the residue of leached chromite ore roast added to the ore." It is suggested that acid-soluble, water-insoluble chromium compounds present in the roast (singled out in an earlier epidemiological study by Gafafer as the possible carcinogens in the chromate-producing industry) exert a sufficiently strong and prolonged effect on exposed tissue to induce a neoplastic response without causing its necrosis by an acute corrosive action. An addendum reports the induction of sarcomas in 6 of 35 rats within five to 6 months after receiving implants of 25 mg of synthetically prepared sintered calcium chromate containing only traces of other elements. This is offered as further evidence of a direct causal role of chromium in the production of cancer.

Clinical Toxicology

Lee H. Miller, M.D., I.M.D.

Farmer's Lung: Report of Two Cases in Which Lung Biopsies Were Performed. R. S. Totten,* D. H. S. Reid, H. D. Davis, and T. Moran. Am. J. Med. 25:803 (Nov.) 1958. (*Department of Pathology, University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania.)

Farmer's lung is produced by the inhalation of products from spoiled ("moldy") hay or other vegetable matter, including silage. The onset is sudden, within hours of exposure, with dyspnea being the most striking symptom. Fever, chills, cyanosis, and weakness also occur. Complete recovery is usually attained in a few days to several weeks. The case histories, chest x-ray films, and photomicrographs of lung tissue from two patients are presented. The essential histologic features are granulomatous pneumonitis and bronchiolitis, varying degrees of interstitial fibrosis, focal obliterating bronchiolitis, and emphysema.

Toxicity of Phosphine, with a Possible Fatality from This Poison. R. N. Harger* and L. W. Spolyar. A.M.A. Arch. Indust. Health 18:497 (Dec.) 1958. (*Indiana University School of Medicine)

Substances containing metallic phosphides present a phosphine hazard, because such phosphides readily react with water, or water vapor, to produce phosphine gas and the hydroxide of the metal. Electric furnace products such as ferrosilicon and calcium carbide contain small amounts of calcium phosphide. Phosphine is extremely poisonous, and the toxic effects may be cumulative. Fifty-nine cases of phosphine poisoning, with 26

deaths, have been recorded since 1900. Symptoms of intoxication are nausea, vomiting, diarrhea, great thirst, sensation of pressure in the chest, back pains, dyspnea, a feeling of coldness, and stupor or attacks of fainting. The case history and postmortem findings of an acetylene generator operator who is believed to have died as a result of inhaling phosphine gas are presented. The analytic methods for determining the quantities of acetylene, phosphine, hydrogen sulfide, and arsine in the environment are described. Tests during certain simulated operations revealed an average phosphine concentration of 8 ppm with an exposure of one to two hours each day. Operational circumstances at the time of death may have produced higher concentrations in the atmosphere.

The Pathology of the Lungs in Five Nickel Workers. W. J. Williams.* Brit. J. Indust. Med. 15:235, 1958. (*Department of Pathology, Welsh National School of Medicine, Royal Infirmary, Cardiff)

Histopathologic changes in the lungs of five nickel workers who were employed at the same refinery are described. The men had worked at various processes at the nickel plant, wet treatment plant, gas producers, copper sheds, iron powder plant, furnaces, and calciners, and at unspecific general labor. The duration of employment was 11 to 35 years. The men were exposed to nickel and arsenic. Squamous-cell carcinomas were present in three cases, and alveolar-cell carcinoma was observed in the fourth. Pulmonary fibrosis was present in the five cases and was indistinguishable from the diffuse interstitial fibrosis of industrial origin, such as that which occurs in asbestosis, and from that seen in nonindustrial long-standing inflammation. The lungs in two cases showed honeycomb or "cystic" change which was thought to be a manifestation of bronchiectasis or bronchiolectosis. Bronchial squamous metaplasia associated with chronic inflammation was noted in two cases. The author believes, although the evidence is inconclusive, that it is possible that nickel together with chronic inflammation may be the carcinogenic factor.

Study of Men with Prolonged Intensive Occupational Exposure to DDT. M. F. Ortelee,* A.M.A. Arch. Indust. Health 18:433 (Nov.), 1958. (*Dept. of Neurology, Albany Medical College, Albany, N. Y.)

Forty men engaged in the manufacturing and formulation of DDT and DDT products were studied. The exposure of all men was mainly dermal and respiratory, although a small amount of DDT was probably ingested. Protective clothing and respirators were not used. Eight men had symptoms of eye irritation which occurred while working in heavy concentration of dust. No correlation between other symptoms and exposure to DDT was noted. The prevalence of physical abnormalities was no greater than reported in other population groups. Mild benign hypertension was detected in nine men, but no cause-and-effect relationship was demonstrated. The hemoglobin values were normal in all cases. Abnormal white blood cell findings, which in all probability were unrelated to the exposure, were found in 13 cases. The plasma cholinesterase was decreased slightly in those men who had been exposed to other insecticides. It is concluded that it is unlikely that chronic DDT poisoning exists in people exposed to the substance at current dietary levels, since evidence of poisoning was not found in men who have absorbed about 200 times as much DDT over long periods.

The Role of Hemodialysis (Artificial Kidney) in Acute Poisoning. G. E. Schreiner.* A.M.A. Arch. Int. Med. 102:896 (Dec.) 1958. (*Department of Medicine, Georgetown University School of Medicine, Washington, D.C.)

The experience accumulated over eight years embracing 24 patients with dialyzable poisons and 15 patients ill from nephrotoxic poisons together with 12 case histories are presented. Survival rates were 83% and 47% respectively. The effective use of hemodialysis in any acute poisoning is based upon the assumptions that (1) the poison can diffuse through cellophane from plasma water reasonably well; (2) it is sufficiently well distributed in accessible body-fluid compartments; (3) there is a time-dose-cytotoxic relationship; and (4) the removal by dialysis adds significantly to the elimination effected by excretion and metabolism. Known dialyzable poisons include phenobarbital, barbital, secobarbital, amobarbital, pentobarbital, diphenylhydantoin, acetyl salicylate, methyl salicylate, bromide, potassium thiocyanate, ammonia, sodium chlorate, strontium and radiocalcium, tritium, and glutethimide. From firsthand experiences, the author concludes that this procedure is very helpful for intoxication produced by barbiturates, salicylates, bromides, and gluetethimide. Indications for hemodialysis in acute nephrotoxic poisoning have included intractable hyperkalemia, fulminating uremic syndrome, and a prolonged course. Multiple graphs that illustrate the results obtained by hemodialysis are presented.

Bagassosis: A Review, with Further Historiral Data, Studies of Pulmonary Function, and Results of Adrenal Steroid Therapy. H. A. Buechner,* A. L. Prevatt, J. Thompson, and O. Blitz. Am. J. Med. 25:234 (Aug.) 1958. (*Medical Service, Veterans Administration Hospital, New Orleans.)

Bagassosis is a pulmonary disorder that results from the inhalation of dust from the fibrous material remaining after the sugar-containing juice has been extracted from sugar cane. Dyspnea is the most characteristic symptom, although cough, hemoptysis, fever, weakness, and weight loss are often present. The x-rays characteristically disclose the presence of miliary shadows symmetrically

distributed throughout both lungs. Complete recovery usually occurs. The specific physiopathological mechanism has never been clearly defined, and the etiology has been attributed to an irritant property of the fiber, its silica content, an allergy, micro-organisms in the dust, and combinations of these factors. Particles similar to bagasse fibers have been found in lung tissue. Tissue changes include an interstitial fibroblastic reaction and the presence of large cells with foamy cytoplasm in the alveolar spaces. The ventilatory function of the lungs is reduced, and the possibility of an alveolar capillary block must be considered. Management included removal of the patient from the exposure and symptomatic and supportive (including adrenal steroid) therapy. Three illustrative cases are presented.

Decompression Sickness: A Review of the Literature and Previously Unreported Histologic Observations. R. J. Sillery. A.M.A. Arch. Path. 66:241 (Sept.) 1958. (*Office of Medical Examiner for the County of Wayne, 400 E. Lafayette St., Detroit 26.)

Decompression sickness occurs despite the use of the medical airlock. The case of a 35-year-old worker who had worked under increased pressure for six hours in a caisson is described. He passed through the medical lock but experienced generalized pain and vertigo on returning home. He was recompressed and slowly decompressed over a one and one-half hour period. His symptoms persisted, and he was admitted to a hospital, where he died shortly after admission. At postmortem examination, the chest, heart, abdomen, omentum, and mesentery were crepitant. On section, most of the blood vessels contained air bubbles. Large amounts of fat were demonstrated in the liver and pancreas, and bubbles were seen within the lipoid masses on microscopic examination. From the experimental work of Paul Bert, the author believes that the bubbles observed contained carbon dioxide as well as nitrogen and concludes that the exact chemical composition of the gas bubbles in this disease has been oversimplified. Photomicrographs that show the gas bubbles in tissues are presented.

An Epidemiological Study of Lung Cancer in Asbestos Miners. D. C. Braun and T. D. Truan.* A.M.A. Arch. Indust. Health 17:634 (June) 1958. (*Industrial Hygiene Foundation, Pittsburgh)

Numerous cases of the simultaneous occurrence of lung cancer and asbestosis have been reported since 1935. This has led many authors to conclude that there is an association between the two diseases. The majority of the reports, however, are clinical and do not contain sufficient epidemiological data to establish the validity of the conclusions.

In this study, records were obtained on 6,091 persons employed in the asbestos mines of Quebec in 1950 with a history of at least five years of exposure. Their status was determined at the end of a six-year period of observation. It was not possible to trace 133 of the men; however, 5,771 were living in 1955. Cancer of the lung was considered to have been reasonably proved in 9 and to be strongly suggested in 3 of the 187 known dead. The mortality rate for lung cancer ("proved" deaths) was 25.3 per 100,000, and, when the suspected cases were included, it rose to 33.4 per 100,000. The mortality rate among the "proved" cases compares favorably with the rate of 22.5 per 100,000 for the rest of the province and 20.8 per 100,000 for adult males throughout Canada. Further, the rate was not related to the length or degree of exposure. It is concluded that the asbestos miners in the province of Quebec do not have a significantly higher death rate from lung cancer than do comparable segments of the general population.

Radiation Health

Thomas S. Ely, M.D.

Common Sense Evaluation of Radiation Exposure in Clinical Radiology. R. R. Newell.* Am. J. Roentgenol. 80:917 (Dec.) 1958. (*U. S. Naval Radiological Defense Laboratory, San Francisco 24)

Somewhere between foolish complacency and baseless fear lies a rational attitude about the facts of radiation effects on individuals and populations. Public concern has increased considerably in recent years because of an increase in potential sources and a greater awareness of existing sources. Reports of the World Health Organization, the National Academy of Sciences-National Research Council, and the committees on radiation protection have helped to bring the subject ultimately to the attention of the general public. The fact remains that medical x-rays are responsible for the largest segment of man-made ionizing radiation dose to the population. The radiologist is the man with the knowledge and experience, and therefore it is his duty to educate. He also has a duty to practice his profession in a manner which will result in the minimum exposure consistent with good radiology. In addition to the high voltage, low milliampere-second, adequate filtration measures, in many procedures the films can be "underexposed" by a considerable factor and yield just as much diagnostic information. A simple means by which the radiologist can assure himself that adequate beam limitation is being used by his technicians, is to insist on the "three-cornered film," that is, one which shows white in three corners.

Responses of the Developing Fetal Nervous System to Roentgen Irradiation. R. Rugh.* Radiology 71: 729 (Nov.) 1958. (*Radiological Research Laboratory, Columbia University, 630 W. 168th St. New York 32)

The embryo and fetus are particularly radiosensitive because of the high rate of growth. De-

velopmental abnormalities can be produced only during the prenatal period, because of the developmental activity and organogeny. Whereas the formed neuron can tolerate doses of thousands of roentgens, in the developmental state, neuroblastic tissue in the embryo is the most sensitive, and neuroblasts rarely survive an exposure of 40 r. The nature and extent of damage to an embryo or fetus not only is affected by the size of the dose, but is also strongly dependent upon the stage of gestation. Although some degree of repair of injury occurs, restoring a normal topography, quantitative deficiency can result. It is recommended that irradiation of the gravid uterus be performed only when necessary for maternal survival.

Modification of X-Radiation Lethality by Autologous Marrow Infusion in Dogs. E. L. Alpen* and S. J. Baum. Blood 13:1168 (Dec.) 1958. (*U. S. Naval Radiological Defense Laboratory, San Francisco)

The postirradiation implantation of hematopoietic tissue such as spleen or bone marrow has been shown to provide protection in rodents and some other species. Success has resulted when autologous or homol gous tissues were used, and some protection was provided even in the case of heterologous tissue. In earlier studies bone marrow injection in dogs was unsuccessful when material from a littermate was used. It had not been known whether the failure represented a rejection of cells by the recipient or a failure of the injected cells to protect. This study utilized groups of mongrel dogs into which autologous and homologous bone marrow and saline control injections were made after 400 and 600 of whole body x-irradiation. The untreated LD_{50} for these dogs was 280 r. It was demonstrated that survival occurred uniformly after the injection of 2×10^9 nucleated cells from autologous marrow, but not after 1×10^9 cells. Homologous marrow was unsuccessful even at levels of 5×10^9 cells. It is suggested that the dog has a significantly greater sensitivity to foreign cells than the rodent or the monkey.

The Geneva Counter: A Large Liquid Scintillation Counter for Men and Mesons. E. C. Anderson. Los Alamos Scientific Laboratory Report 2238, Oct. 15, 1958. (Price $1.00. Available from the Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.)

"A new and greatly improved liquid scintillation counter, constructed for the Second Conference on Peaceful Uses of Atomic Energy at Geneva, is described. Natural potassium activity of the human body can be measured to a precision of 3 per cent in 100 seconds of counting time, and the sensitivity for extraneous gamma activity is better than 0.001 μc. Hard beta emitters, such as Sr^{90} and Y^{90}, can be measured at 10 per cent of the maximum permissible body burden. Energy resolution is adequate to permit simultaneous measurements in 4 energy channels, e.g., K^{40}, Cs^{137}, I^{131}, and bremsstrahlung.

"As illustrations of the usefulness of large detectors for the study of cosmic rays and rare nuclear events, results are given of the measurement of the mu meson half-life and decay electron spectrum and of the cosmic ray background spectrum above 1,000 Mev." (Author's abstract.)

Protecting and Cleaning Hands Contaminated by Synthetic Fallout Under Field Conditions. R. H. Black. U. S. Naval Radiological Defense Laboratory Report TR-256, August, 1958. (Available from U. S. Naval Radiological Defense Laboratory, San Francisco 24.)

"Hands of field test personnel became radioactively contaminated with (a) dust or slurry synthetic fallouts containing La^{140} tracer, and (b) La^{140} in acid solution. Two protective creams and several cleaning materials were used in an attempt to reduce adherence of contaminant and to facilitate decontamination. The protective creams were not found to be advantageous. Three experimental cleaning solutions (isotonic neutral solution of a complexing agent plus a detergent and germicide; an isotonic saline solution at pH 2.0 plus detergent and germicide; and a 3% citric acid solution) were found to decontaminate skin more readily than soap and water. A waterless mechanic's hand cleaner was found to clean hands with the same effectiveness as soap and water." (Author's Abstract.)

Delayed Effects of Ionizing Radiation in Man. J. L. Tullis.* A.M.A. Arch. Path. 66:403 (Oct.) 1958. (*Cancer Research Institute, New England Deaconess Hospital, Boston 15)

It was not long after the discovery of x-rays, 63 years ago, that their ability to cause acute injury became recognized. The delayed effects, however, which can follow a single large dose after a latent period, or follow repeated smaller doses, were much less apparent. One recorded case of squamous-cell carcinoma occurred 49 years following a single massive dose. Delayed skin effects include atrophy of the epidermis, fibrosis of the dermis, hair loss, and carcinoma. Many well-documented cases have been reported. Such studies as those on the atomic bomb survivors in Japan, radiologists, and cases of ankylosing spondylitis and thymic enlargement treated with x-rays yield data which indicate a significant increase in incidence of leukemia. Another study demonstrates a higher rate of thyroid cancer in persons who had thymic irradiation. An abnormal frequency of bronchogenic carcinoma has been reported in pitchblende miners. Well known are the cases of aseptic necrosis and tumors of bone found in radium dial painters and patients who received radium therapeutically. Not so well known are the cases of leukemia and tumors which have been found in persons who have received thorium dioxide (Thorotrast) for diagnostic radiography.

Tumors of the nasopharynx and female pelvic organs have been attributed to previous irradiation. Cataract is a late effect which follows sufficient irradiation of the lens. Aging and shortening of the life span have been demonstrated in experimental animals but are difficult to substantiate in a human population.

Use of a Gamma Ray Spectrometer for Investigation of Plutonium Contaminated Wounds. E. A. Putzier,* J. R. Mann, and V. P. Johnson. Am. Indust. Hyg. A. J. 19:384-385, October 1958. (*The Dow Chemical Company, Rocky Flats Plant, Denver)

A scintillation detector consisting of a sodium iodide crystal, a stock photomultiplier tube, and a lead shield and collimator, has been used for the detection and semiquantitation of Pu^{239} in wounds by counting the 17 kev x-rays. By removal of the detector from the shield, the instrument can easily be aligned with a specific surface area, and by stopping down the aperture, further resolution within an area can be achieved. Reasonable agreement was obtained between instrument determinations and alpha analysis of tissue following wound excision.

Noise and Hearing

H. O. Parrack, Ph.D.

Associated Industries of New York State, Inc., Fourth Noise Conference. Am. Indust. Hyg. A. J. 19:386 (Oct.) 1958.

This is a collection of articles, given by 18 individuals, that pertain to industrial noise and hearing. The first is an introduction to this problem area, and the last is a summary of the results of the conference. This group of articles covers legislative, legal, economic, medical, and engineering aspects of the problem created by the effects of exposure to industrial noise. Several papers describe the application of noise control measures to specific industrial problems. These papers, as a group, rather clearly define the components of a complex problem, indicate the progress toward solutions made over a period of 8 to 10 years, and describe many practical tools that can be employed to reduce the undesired effects of industrial noise on hearing.

Noise—Is It a Health Problem? A. Glorig* and A. Summerfield. J.A.M.A. 168:370 (Sept. 27) 1958. (*111 N. Bonnie Brae St., Los Angeles 26.)

The authors seek to define "noise" in a way that is meaningful when considering its effects on men. The effects of exposure to noise are then discussed under two general categories: (*a*) nonauditory effects and (*b*) auditory effects. The aim is to state carefully the known relations between exposure to noise and the effects of this exposure on man. It is concluded that nonauditory effects produced by typical industrial noise exposures—speech interference, annoyance, changes in efficiency, and physiological changes—do not constitute a health hazard. The authors also conclude that the effects of noise exposure on the hearing organ threaten the health of a large segment of the industrial population. Enough is known about the relations of hearing loss to noise exposure to say that a hearing conservation program is required whenever persons are exposed to continuous noise, 5, 6, or more hours a day, 5 days a week, 50 weeks a year, for several years and whenever the sound pressure level in any of the three octave bands 300-600 cps, 600-1200 cps and 1200-2400 cps exceeds 85 db.

The Importance of Occupational and Medical History in Hearing Loss Cases. W. F. House* and A. Glorig. Noise Control 4:36 (Sept.) 1958. (*University of Southern California School of Medicine. Los Angeles.)

The authors point out that the cornerstone of the individual workman's compensation case is the physician's examination and report. They then identify the important factors that must be considered in the preparation of this report. Stress is placed on the importance of the occupational and medical history in arriving at a diagnosis where noise-induced hearing loss is claimed and in preparing the medical report setting forth this diagnosis.

Evaluation of Operating Conditions on a Békésy-Type Audiometer. J. F. Corso.* A.M.A. Arch. Otolaryng. 61:649 (June) 1955. (*Pennsylvania State University, University Park, Pa.)

Recently, "automatic audiometers" have been used extensively in carrying out industrial hearing conservation programs. Their use will probably increase in the future, and it will be necessary for the physician specializing in occupational medicine to understand certain problems connected with the operation of these audiometers. The authors evaluate the effects of several operating conditions of one type of automatic audiometer on the hearing thresholds obtained. This study points out clearly some of the operational variables with which the industrial physician must be familiar.

Effects of Testing Methods on Hearing Thresholds. J. F. Corso. A.M.A. Arch. Otolaryng. 63:78 (Jan.) 1956.

The hearing threshold obtained with either a standard clinical audiometer or an automatic audiometer may be influenced by the testing methods employed. In this paper the author studies the influence of several testing methods on the results obtained by one type of clinical audiometer and one type of automatic audiometer. The data presented will familiarize the industrial physician with the effects of the testing methods on the data obtained by the two instruments studied. This information will guide him in evaluating the audiograms obtained as a part of his hearing conservation program.

Abstracts

Additional Variables on the Békésy-Type Audiometer. J. F. Corso. A.M.A. Arch. Otolaryng. 66:719 (Dec.) 1957.

The author evaluates the influence of four different variables on the audiograms obtained with one type of automatic audiometer. The data given will guide the industrial physician in interpreting the audiograms obtained with use of automatic audiometers and may also assist him in determining the type of automatic audiometer most suited to his purposes.

Mental Health

Graham C. Taylor, M.D.

The Supervisor Hasn't Had a Chance. M. S. Lochman.* Advanced Management 23:17 (Nov.) 1958. (*Supervisor, Management and Engineering Training, Convair, Division of General Dynamics Corp., San Diego, Calif.)

The author observes that "for many years business and industrial human relations training courses for supervisors have concentrated on beating supervisors over the head with a club, implying there would be no human relations problems if they would only treat people right. This approach has weakened the supervisor's position more than most of us care to admit." He argues that we should not be concerned with instructing supervisors in how to manipulate people but rather with giving them a better understanding of human behavior in the work situation, and he makes a cogent observation that "men tend to supervise as they are supervised."

Managerial Decision-Making. H. F. Smiddy.* Advanced Management 23:5 (Nov.) 1958. (*Vice President, Management Consultation Service. General Electric Company, New York.)

The author points out that managers make decisions and that their work, in addition, "consists of blending thought and action in decision-making, to secure balanced results. . . ." He argues that, contrary to current beliefs, decisions are made only by individuals and not by groups. He further states that many individuals can make decisions within the business organization, but even with decentralization of decisions they are not made responsibly by all persons. The manager can assign decision-making responsibility to a specialist, who is then personally responsible and not simply "an isolated expert in his own cell of technical competence."

Comments on Conformity. M. H. Mescon. J. Soc. Personnel Administration, November-December, 1958, p. 13.

Perhaps aware of current comments about pressures toward mass conformity, the author argues that "Certainly, few would dispute that technology, integrated into a dynamic social and economic framework, has resulted in greater productivity and a generally higher standard of living." He asserts that conformity gives greater rewards than individuality and concludes that "it appears that in a complex, dynamic, highly specialized society individuality must be relegated to a secondary position."

Dynamic Aspects of the Personnel Manager's Role. K. D. M. Dauncey.* Personnel Management, September, 1958, p. 162. (*Superintendent, Personnel Service, The Steel Company of Wales, Ltd., Cardiff.)

This is an article with a theoretical approach—an examination of the processes which determine the relationship between personnel and line management. The author contends that personnel managers have an executive role concerning the evaluation of human decisions in general management as well as their usually assigned advisory or staff role.

Some idea of the scope of the article may be given by the section headings, which read as follows:

Differences between formal and informal organization; diagnosis of the needs of an organization; the aim and execution of a company's personnel policy; the "ethos" of an organization; personnel management: an executive role; an advisory role; and a dynamic relationship.

References are made in recent literature to the "corporate personality." The author observes in this connection that "Every organization develops what can be described as its own 'ethos': that body of thought which is common to the organization as a whole, which enables everyone to define more or less intuitively what is and is not acceptable or desirable."

The Counseling Interview—Crux of a Man's Development. J. J. Grela and F. B. Martin. Personnel Journal 37:209 (Nov.) 1958.

This article describes the counselors' role in the appraisal of executives. The executive is provided with an evaluation guide which is "not a mere check list of strengths and weaknesses. It is a detailed reminder to the executive of what was discussed." It is the contention of the authors of this article that every man is his own judge as regards appraisal when done by this method. The type of counseling interview for executive appraisal described here is that developed by management consultant agencies. Modifications of this method would probably be required if the interviewer were within the power structure of the company.

1960—World Mental Health Year. Quart. J. World Fed. Ment. Health 10:76 (May) 1958.

Under Proposals for Action, there are listed five general objectives, one of which—Objective 4—reads as follows: "To develop knowledge and techniques for dealing with the human relations problems that occur in industries and all types of occupation. This should lead to further ad-

vances in human welfare in already industrialized countries, and help to ensure that some of the difficulties encountered there are avoided in countries going through the earlier stages of industrialization and mechanization." Here is an attempt to begin to study the reactions of various cultures to the problems of increasing industrialization. Those in the field of occupational medicine in the United States will be able to share information and points of view with occupational physicians in the countries entering the phase of industrialization.

The Organization: What Makes It Healthy? Argyris, C. Harvard Business Rev. 36:107 (Nov.-Dec.) 1958.

This article is based upon a two-year study of an organization which, in general, was considered to be healthy. The usual indexes—low turnover, low absenteeism, and low scrap rate—all pointed to a healthy company. However, on examining more carefully the attitudes of the people involved certain other points of view came into focus. For example, 60% of the employees consider "management is excellent—fine people because we hardly ever see them and they hardly ever bother us." "About their work, 65% report that they experience no personal satisfactions from their jobs other than the wages and job security." Briefly, it is argued that in the typical organization—with its pyramidal structure—employees in general are placed in a work situation which utilizes a minimum of their creative and individual skills. The work therefore becomes more and more routine, and psychological reactions of frustration and conflict begin to emerge. The employees become apathetic and indifferent and are what the author describes as psychologically immature. This is inevitable, he argues, because of the nature of the work, organization structure, and the leadership.

In this situation, the important needs appear to be "togetherness and aloneness." These people are alienated from their own deeper feelings and values. It is argued that the employees react to this by an emphasis on material rewards in return for the vague feelings of dissatisfaction. A psychological contract, in effect, is set up. "In effect, each employee, by accepting the contract, promises to produce a fair day's work in return for (1) wages and job security, (2) being left alone by both management and employees, and (3) having only skin-surface, 'friendly' relations with everyone."

In reaction to all this, management itself can become immature and also stress superficial types of reactions—in particular, a superficial type of friendliness and understanding.

In short, organizational health turns out to be very complex, involving many factors, and, according to this article, the varied defensive reaction of the members of the organization, namely, apathy and indifference and "togetherness," may in the long run impair the vitality of the organization itself.

Abstracts

Orthopedic Surgery

Robert W. Bailey, M.D.

Surgical Anatomy in Lacerations of the Wrist and Hand. S. E. Reed* and W. F. Scheffbauer. Surg. Gynec. & Obst. 107:383 (Sept.) 1958. (*Evanston Hospital, Evanston, Ill.)

The authors point out the import of applied anatomy in injuries of the hand and wrist. Unless one has frequent occasion to review the anatomy of the wrist, the important relationships may be quickly forgotten. The orientation is made from the surgeon's own hand, using the three superficial tendons—palmaris longus, flexor carpi radialis, and flexor carpi ulnaris—as the key tendons.

Tetanus, A Preventable Disease. C. A. Sherman, Jr.* and D. Barnhouse. Surg. Gynec. & Obst. 107: 142 (Aug.) 1958. (*School of Medicine, University of Rochester, Rochester, N. Y.)

Observations are made on the significance of tetanus in the United States. Between 500 and 600 persons die each year of the disease. In the armed forces during World War II, the incidence of tetanus was almost nil, indicating the import and effectiveness of the immunization program. The history, pathogenesis, and diagnosis of the disease are reviewed.

A suggested outline of treatment of clinical tetanus is presented with emphasis on four points: (1) neutralization of the circulating toxin, (2) adequate sedation to prevent spasms and convulsions with consequent respiratory death, (3) early tracheotomy to ensure an adequate airway and proper cleansing of the tracheobronchial tree, and (4) constant medical and nursing attention.

Programs of active and passive immunization and the precautions to be taken prior to the injection of foreign protein are reviewed. The use of tetanus antitoxin is presented in some detail, along with discussion of the complications one may encounter and the methods of combating such complications.

The authors urge a much greater use of tetanus toxoid in active immunization to prevent the needless loss of time and life from this disease.

Arteriography as an Aid in the Diagnosis and Localization of Acute Arterial Injuries. M. B. Lumpkin,* V. D. Longan, C. M. Couvis, and J. M. Howard. Ann. Surg. 147:353 (March) 1958. (*Emory University School of Medicine, Atlanta.)

The role of arteriography in chronic obliterative vascular disease has been well defined. Because of the therapeutic urgency, this diagnostic adjunct has been overlooked in evaluation of acute vascular trauma. The authors believe that there is a need for better methods of diagnosing acute arterial injuries than clinical examination. Twenty-two patients form the basis of this study.

which was confined to injuries of the lower extremities. Arteriography was performed by the conventional method, with the patient in the operating room prepared for the definitive surgery. The value of arteriography is emphasized. Because arteriograms were normal despite clinical evidence of arterial injury, the authors believe that several arterial explorations were avoided. One of the greatest benefits promises to be in those patients in whom arterial injury is suspected, but in whom peripheral pulses are intact.

The conclusion reached in this study is that arteriography in suspected acute arterial injuries (22 cases) has been of value in accurate diagnosis and localization of the arterial damage when present.

Life Expectancy After Fracture of the Hip. W. T. Fitts,* H. B. Lehr, S. Schor, and B. Roberts. Surg. Gynec. & Obst. 108:7 (Jan.) 1959 (*Hospital of the University of Pennsylvania, Philadelphia.)

A life table was made for the general population containing the same proportion of persons of males, the same proportion of persons of various ages and the same proportion of whites as in a group of patients with fractured hips. A life table based on actual mortality of the hip fracture patients was then calculated. It was found that, if the sample of patients with a broken hip survived as long as six months after fracture, their life expectancy was not appreciably less than for the general population of the identical age, sex, and race, which was approximately 11 years. The study is based on 109 fractures, all but 12 being treated by surgery. The authors analyze the deaths in the first six months, and their findings agree with those of previous reports.

The Management of the Burned Hand. D. C. Robertson.* Bone & Joint Surg. 40-A:625 (June) 1958. (*Department of Surgery, University of Toronto, Toronto, Ont.)

This report is based on over 250 patients hospitalized for the treatment of burns. Among these, about 50 hands required treatment. The location of the burns was practically confined to the dorsum of the hand, a third degree burn of the palm being uncommon in this series.

Closed treatment of the burn with the hand in the position of function on a Chicago universal splint constitutes the initial treatment following gentle debridement and profuse irrigation. Dressings are carefully changed on the 11th day, under general anesthesia, in the operating room. At this time, all necrotic material is carefully removed and the area is dressed. Subsequently, at two day intervals, the same procedure is performed four times. At about the 17th or 18th day thereafter, careful debridement is again repeated and a very thin (about 0.01 inch) split-thickness skin graft is applied. Five days later, the dressings are removed.

Few complications and restoration of a functionally adequate and cosmetically satisfactory hand have been the general experience reported by the author with this approach.

Industrial Hygiene

Edward C. Riley, M.D.

A Case of Beryllium Disease. C. H. Wood, K. P. Ball, and N. D. Teare. Brit. J. Indust. Med. 15:209, 1958.

The authors report a case presenting a real diagnostic problem, the patient having had a history of mixed exposure to coal dust, mesothorium, and silica, in addition to five years of making fluorescent powder for tubular lights. While making fluorescent lights, he collected beryllium oxide from a ball mill, mixed it with silica gel, and heated it to 1,200° to 1,800° C. After firing, he tipped the mix into bins, broke up the lumps by hand, sieved it, and then tipped the powder into bags. In 1949, he left this job because of shortness of breath and general malaise. For a period after that he worked as a clerk, and in May, 1951, at the age of 36, was admitted to the hospital with a diagnosis of bronchopneumonia. The only medication which provided any relief was corticotropin, 20 mg q. 6 h. In spite of medication, chest radiographs showed an increase of nodulation, and he developed right heart failure from which he died, in September, 1955. Histopathologically, the lung showed diffuse and focal chronic sarcoid-like pulmonary granulomatosis and emphysema but little fibrosis.

Although there is no indication of the actual exposure of this patient to beryllium oxide, there is good reason to accept the diagnosis of beryllium disease. This case is again a reminder that, as the incidence of this disease is reduced by preventive measures, diagnosis may be more difficult, and it is important to be alert to the possibility of this disease.

The Tissue Reaction in the Lungs of Rats After the Inhalation of Coal Dust Containing 2% of Quartz. E. J. King et al. Brit. J. Indust. Med. 15:172, 1958.

In this study the authors have undertaken "to find out whether a small amount of silica mixed with pure anthracite coal would lead to pulmonary fibrosis. Two dusting experiments were set up, the first with a light exposure to quartz alone and the second with a mixture of 2% quartz and 98% coal. Although the dust exposures could not be adjusted so that the concentrations of quartz dust were identical, the exposures were arranged so that the total particle hours of dusting approximately equalize the daily exposure to quartz of each group of animals. Although rats were dusted over a period of 500 days with these two dust suspensions, there was no fibrosis produced in the lung or lymph nodes of the animals dusted with either the low concentration of quartz alone or 2% quartz with 98% anthracite.

"The amounts of silica found by analysis of these rats (silica alone) were much less than those in the mixture of anthracite and 2% quartz despite the quartz particle hours of testing being roughly similar." The study suggests "that small amounts of dust are got rid of without causing any damage to the lungs of lymph nodes; when they contain large amounts of coal, the lungs may not be able so readily to rid themselves of small amounts of quartz." Although none of the rats tested developed typical silicotic fibrosis in the lungs or lymph nodes, discrete dust foci developed in the lungs and lymph nodes of the rats tested with the 98% anthracite and 2% quartz.

Nasal Sampling of Aerosols in Experimental Animals. G. Asset.* A.M.A. Arch. Indust. Health 18: 460, 1958. (*Physicochemical Research Division, U. S. Army Chemical Warfare Laboratories, Army Chemical Center, Md.)

"Two independent experiments are described of nasal sampling or particle intake in the guinea pig and the dog. Special samplers were made the same size and shape as the heads of the species under study." The results indicate a significant effect on the ratio of C_1 and C_2 (the concentration of aerosol flowing into nostrils to concentration flowing toward the animal) of particle size and wind velocity, especially for aerosols of larger particle size.

This paper points out some of the difficulties in measuring animal exposures to aerosols but provides no new theory or data which can be used to circumvent this problem.

Copper Poisoning from Vending Machines. S. H. Hopper,* and H. S. Adams. Pub. Health Rep. 73:10 (Oct.) 1958. (*Indiana University School of Medicine, Indianapolis)

Although copper poisoning from carbonated beverages from vending machines is not strictly an occupational hazard, because of the fact that the greatest concentration of these machines is probably in industrial plants, it may be considered an industrial hygiene problem. The authors mention five different cases "each one involving a number of persons. Concentrations of copper from a few parts per million to several hundred parts per million have been demonstrated in carbonated beverages from vending machines directly connected to copper water lines." As the author points out, in no instance has there been a serious case of intoxication from these exposures, since the acute effects, nausea and vomiting which occur within 15 minutes after drinking the beverage, generally remove the toxic beverage quite effectively. The summary states that "if the check valves in a post-mix type vending machine do not function correctly, carbon dioxide may enter the water supply line. In the event that this line is made of copper, then (a) the CO_2 or carbonated water will react with the copper; (b) under certain conditions, the quantities of copper going into solution could be quite large; and (c) copper poisoning could occur from a beverage dispensed from a postmix type, carbonated beverage machine.

"Support is thus given to recommendations that these machines be designed and constructed so as to preclude contact between copper and CO_2 or carbonated water, and such machines be equipped with a device or devices that provide a positive protection against the backflow of CO_2 or carbonated water into the building water supply system."

NOTE: With the increasing use of vending machines for carbonated beverages of the post-mix type copper contamination is possible, even where well-designed and constructed equipment is installed. The use of two check valves in the water line may reduce the likelihood of this type of accident but does not completely eliminate it. We have observed several instances of this type of illness from machines provided with the approved check valve.

Case Illustrating the Effect of Calcium Disodium Versenate ($CaNa_2$ E.D.T.A.) on Chronic Mercury Poisoning. S. M. Woodcock. Brit. J. Indust. Med. 15:207, 1958.

This report of a rather severe case of mercury poisoning in a 24-year-old woman who worked for six months in a factory calibrating mercury containing pressure gauges illustrates the relative value of 2,3-dimercaptopropanol (BAL) and calcium disodium versenate ($CaNa_2$ EDTA). The author's summary states that "contrary to previous reports, $CaNa_2$ EDTA resulted in an increased urinary excretion of mercury while BAL did not. It is concluded that $CaNa_2$ EDTA is of value in the treatment of chronic mercury poisoning." In addition to presenting a rather severe case with classical signs and symptoms of mercury poisoning, this case is a reminder to the industrial physician and hygienist that mercury poisoning can occur if preventive measures are not utilized. This history states that on the average two or three coils a day burst during testing, so that the work bench was usually contaminated with metallic mercury. "Despite warnings about the dangers of ingesting mercury, she ate sweets at work and had a habit of sucking her fingers." The implication here is that the primary exposure was through ingestion; one wonders, however, since the bench was rather heavily contaminated with metallic mercury, whether or not ingestion was the primary route. It is well known that without good ventilation mercury vapors may build up in the atmosphere to hazardous concentrations.

An Experimental Study of Aerosol Deposition in Human Subjects. P. E. Morrow,* E. Mehrhof, L. J. Casarett, and D. A. Murken. A.M.A. Arch. Indust. Med. 18:292 (Oct.) 1958. (*Medical Center, University of Rochester, Rochester, N. Y.)

The aerosol studied was sodium chloride dispersed as a heterogeneous solid aerosol of about

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10^6 particles/cc with a count median diameter of 0.052μ and a geometric standard deviation of 2.26.

These studies on man (17 experiments on seven normal subjects) indicate a mean mass deposition of submicronic sodium chloride aerosol of 63.4%. There also appeared to be a relationship between the mean tidal volume, the respiratory frequency, the inspiratory and expiratory flow rates, and the percent deposition.

Evaluation and Control of Lead Exposures in Powder Metallurgy Operations. James S. Holtaway. Am. Indust. Hyg. A. J. 19:481 (Dec.) 1958. (*American Brake Shoe Company, Chicago)

An industrial hygiene survey in March, 1957, demonstrated concentrations of lead in the air adequate to produce the increased urinary excretion observed the previous November when urine samples were obtained.

"Machines were exhausted by local exhaust hoods connected to unit type collectors. . . . The collectors were of the cabinet cloth filter type in which the dust laden air is drawn into the cabinet, through a set of cloth filters, through the fan chamber, and then back into the room via an exhaust vent on top of the cabinet. . . . The survey disclosed a number of conditions in the plant which contributed to some extent to the general pollution of the atmosphere but the high concentrations (0.70 milligram of lead per cubic meter of air in some instances) found in the discharge stream of the collectors from the presses left little doubt that the recirculated air was the most important source of contamination. Improper hygienic and safety practices such as dry sweeping and indiscriminate use of air hoses to clean off machines and clothing, added their share of dust to the general atmosphere and allowed particles to settle on the super-structure of the plant. It was obvious, therefore, that the conditions existing in the working areas were compatible with the creation of a definite lead hazard." Apparently there were no clinical cases of lead intoxication in this plant.

An entirely new system of ventilation utilizing no recirculation was designed and installed. "Vacuum cleaning was substituted for dry sweeping and an educational program was introduced to secure employees' cooperation in maintaining good housekeeping and eliminating improper and unhealthful practices. Adequate volumes of tempered make-up air were assured by providing for this in the design of the new ventilation equipment."

A follow-up industrial hygiene survey made after the improved ventilation and program had been placed in effect showed a reassuring drop in urinary lead excretion rates from 311 to 82 mg. of lead per liter of urine and a comparable lowering of the mean lead in air concentrations from 0.26 mg. in March, 1957, to 0.06 mg. of lead per cubic meter of air in November, 1957. This study demonstrates the value of an industrial hygiene survey even, when to the casual observer, controls might appear to be adequate. It also points out the potential hazards from particulate lead exposures as well as the potential dangers from recirculating air used for exhaust ventilation in occupied spaces.

Reparative Surgery

Robert J. Trettin, M.D.

On the Permanence of Anti-Tetanus Immunization. E. S. Stafford,* T. B. Turner, and L. Goldman. Ann. Surg. 140:563 (Oct.) 1954. (*The Johns Hopkins University, Baltimore.)

The authors report on a study of the antitoxin levels in the serum of 175 individuals in three different categories of immunization. Actively immunized individuals continue to have measurable levels of serum tetanus antitoxin up to 11 years and during this period retain the ability rapidly to produce high levels of serum antitoxin in response to a booster injection of toxoid. It is recommended that in civilian practice a stimulating dose of tetanus toxoid alone be administered when indicated for the prophylaxis of tetanus in the treatment of injuries sustained by individuals when there is a reliable history of previous active tetanus immunization. Efforts should be made to enlarge constantly the portion of the population enjoying basic immunity to tetanus.

Clinical Use of Synthetic Arterial Substitutes in Three Hundred Seventeen Patients. E. S. Crawford,* M. D. De Bakey, and D. A. Cooley. A.M.A. Arch. Surg. 76:261 (Feb.) 1958. (*Department of Surgery, Baylor University College of Medicine, Houston, Texas.)

This report is concerned with observations derived from an analysis of a three-year experience with tubes made of Ivalon (polyvinyl formalinized) sponge, Orlon taffeta, knitted nylon-Dacron, knitted Orlon-crimped woven nylon, and knitted Dacron used to replace or bypass aortic and peripheral arterial lesions in 317 patients. In an addendum, the authors report the exclusive use of the new flexible knitted Dacron tube as a vascular replacement in their last 237 cases. There were no "graft failures" or complications attributable to the use of the graft. On the basis of this experience along with the technical facility of its application, they believe the knitted flexible Dacron tube to be the most satisfactory available vascular replacement.

Inguinal and Femoral Hernioplasty. C. B. McVay* and J. D. Chapp. Ann. Surg. 148:499-509 (Oct.) 1958. (*University of South Dakota School of Medical Sciences, Yankton Clinic, Yankton, S. D.)

This report discusses a 1 to 11-year follow-up on 580 hernioplasties utilizing the methods previously described by the senior author. The premises upon which the repairs are based are restated. For the small to medium-sized indirect

inguinal hernias, the hernia sac was excised and the abdominal inguinal ring tightened by suturing the transversalis fascia to the anterior layer of the femoral sheath, medial to the cord. In 344 cases, a recurrence rate of 3.2% was reported. The importance of high ligation of the sac with tight closure of the abdominal inguinal ring, the experience and judgment necessary to evaluate the posterior inguinal wall, and the significance of the missed femoral hernia are emphasized.

For large indirect inguinal, direct and femoral hernias, a new posterior inguinal wall is reconstructed. This briefly consists of excising all attenuated aponeuroticofascial structures, the relaxing incision, and a "slide" of the rectus sheath into the position of a new posterior inguinal wall by utilizing Cooper's ligament, the transition suture, and the anterior layer of the femoral sheath.

In 236 cases, a recurrence rate of 0.85% is reported.

The inguinal ligament was not used in any of the hernioplasties in this series.

The Nuclear Weapon Explosion and Its Effect on Treatment of Soft Tissue Wounds. W. H. Moncrief, Jr.* S. Clin. North America 38:1453 (Dec.) 1958. (*Director, Division of Surgery, Walter Reed Army Institute of Research, Walter Reed Army Medical Center, Washington 12.)

The resolution of the problem of soft tissue injury and wound treatment after the detonation of a nuclear weapon is inconclusive in the minds of most for two reasons: the effect of whole body radiation on wound therapy and the types of wounds that will be seen for treatment. From the nuclear weapon explosion, high velocity soft tissue wounds requiring extensive debridement will not be commonplace. The large crushing wounds of the extremities will be in the minority, for these individuals will be within the parameters of secondary thermal following the explosion. The soft tissue wounds seen will be lacerations and superficial penetrating wounds. Simple lacerations and surgical wounds closed before the maximum response to radiation has set in should do well. Granulating wounds will retrogress during the period of hematopoietic response to radiation and, with recovery from radiation, will heal.

The Problem Back. J. E. Kirkpatrick.* J.A.M.A. 168:1864 (Dec.) 1958. (*516 Sutter St., San Francisco 2.)

The so-called problem back occurs most frequently when the element of chronicity arises. Chronic back complaints are most commonly due to disease, structural abnormality, environmental attitudes, or a combination of one or more of these conditions. None of the rheumatic diseases—fibrositis, myositis, bursitis, gout, rheumatoid spondylitis, rheumatoid arthritis, and osteoarthritis—have ever been created by slight or severe mechanical trauma in experimental animals or human beings. These diseases are associated with dysfunction of the reticuloendothelial system, often with development of granulomatous inflammations in the musculoskeletal system. The course of granulomatous inflammation is toward chronicity and recurrences. The cause of the condition is still unknown, and the author believes that when it is discovered, it will not be microtrauma or wear and tear. Trauma does not produce a persistent stimulative effect on the cells of the reticuloendothelial system.

A more precise diagnosis of back complaints will provide a worth-while service to the patient and significantly alter the statistics in regard to alleged back injury.

Diagnostic Paracentesis. J. H. Strickler,* P. D. Erwin, and C. O. Rice. A.M.A. Arch. Surg. 77: 859 (Dec.) 1958. (*1635 Medical Arts Bldg., Minneapolis, Minnesota.)

A refinement in technique of diagnostic paracentesis is presented. The insertion of a long tube of polyethylene is suggested as a means of increasing the reliability of this peritoneal tap. A survey of the literature combined with this experience in more than 100 cases has served to dispel concern over the rare occurrence of entering the bowel lumen.

Diagnostic paracentesis is recommended by the authors for the "acute abdomen" where the diagnosis is not clearly established by other diagnostic means. This is especially evident in the complex or unusual problems of intraperitoneal disease or traumatic injury. Of 12 patients in whom paracentesis was performed for abdominal trauma, a bloody tap, confirmed by operation, was found in 11.

A positive tap is obviously more significant than a negative tap, but with increased experience one learns to depend upon the negative results. Perforation is more likely to occur where bowel is adherent to the abdominal wall, and, therefore, previous surgical sites should be avoided.

The Problem of the Painful Scar. J. C. White.* Ann. Surg. 148:422 (Sept.) 1958. (*Neurosurgical Service, Massachusetts General Hospital, Boston.)

Partial injury to peripheral or intercostal nerves from surgical incisions or accidental lacerations may occasionally lead to serious disturbances of sensory perception. These include painful scars and disagreeable paresthesias over the entire distribution of the nerve caught in the underlying cicatrix. The purpose of the article is to emphasize the painful complications that may follow peri- and intraneuronal scarring of intercostal and subcutaneous nerves and to urge surgeons to make every effort to avoid unnecessary injury to these structures.

When post-traumatic neuralgia is once established, spontaneous remission is rare and relief by surgery difficult. Local operations such as excision of sensitive end-bulbs, neurolysis, or proximal neurotomy are seldom successful. Sympathectomy in these cases is not effective. The neu-

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rosurgeon is therefore often forced to undertake major procedures such as posterior rhizotomy or anterolateral cordotomy.

Brief case summaries are given of 25 patients. All but two of these were operated upon, and two required secondary procedures to gain relief. Of these, only 14 obtained fully satisfactory results.

Marlex Mesh, A New Plastic Mesh for Replacing Tissue Defects. F. C. Usher* and J. P. Gannon. A.M.A. Arch. Surg. 78:131 (Jan.), 1959. (*727 Hermann Professional Bldg., Houston 25, Texas)

In experimental studies, Marlex mesh was used to replace large defects in the abdominal wall, chest wall, and diaphragm of 31 dogs. Examination of the mesh after six months' implantation showed no fragmentation and no decrease in tensile strength. Histologic examination revealed it to be uniformly infiltrated with pliable fibrous tissue. Infection studies demonstrated that granulation tissue would grow through the mesh in the presence of purulent infection without slough of the graft or sinus formation.

In clinical studies, Marlex mesh was used in 78 patients with hernias or other tissue defects, with excellent results and no recurrences to date. The material is inert in the presence of infection, and the three cases in which wound abscesses developed all responded to treatment by open drainage and administration of the specific antibiotic. In none of the infected cases was it necessary to remove the mesh.

Although it is too early to evaluate these cases from the standpoint of recurrence, the authors have been impressed with the firm repair resulting from the use of Marlex mesh and believe it will prove a valuable adjunct in the repair of tissue defects.

Dermatology

Donald J. Birmingham, M.D.

Contact Dermatitis from Neomycin. C. D. Calnan* and I. Sarkany. Brit. J. Dermat. 70:435 (Dec.) 1958. (*St. John's Hospital for Diseases of the Skin, London, England.)

The authors report on 14 cases of contact dermatitis occurring during the use of neomycin ointment. These data were presented not only because of the increasing use of neomycin as a topical antibiotic, but also to alert physicians to some of the diagnostic pitfalls associated with dermatitis occurring from the use of neomycin.

The cutaneous reactions noted were usually of the eczematous type, for which histologic and patch test evidence were submitted. Some patients with a true specific sensitivity to neomycin may fail to react to the diagnostic patch test. Usually, however, these patients will react to an intradermal injection of a 0.05 ml of 1% solution of neomycin. The authors attribute the negative patch test to an inability of the allergen to penetrate the reactive layers of the skin. The patch test inconsistency had been previously noted by Epstein, who felt that the altered reaction was due to dermal sensitivity.

In this series of cases, cross-reactions to 1% streptomycin were noted in 2 of the 14 cases. This finding validates the reports of cross-reactivity between neomycin and streptomycin which have been reported by others.

Intradermal Tests with Metals and Other Inorganic Elements in Sarcoidosis and Anthraco-Silicosis. W. B. Shelley,* H. J. Hurley, R. L. Mayock, H. P. Close, and R. T. Cathcart. J. Invest. Dermat. 31:301 (Dec.) 1958. (*Dept. of Dermatology, University of Pennsylvania School of Medicine, Philadelphia.)

The exact cause of sarcoidosis is not known, but considerable evidence suggests that the condition is based on an allergic reactivity on the part of the host. Along with this concept is the interesting sarcoidal response of the skin which can result from the introduction of beryllium, silica, chrome, zirconium, and possibly other metals. The sarcoid-like disease produced by the inhalation of beryllium has been studied extensively. These known facts, along with studies dealing with the epidemiology of sarcoid by other investigators, prompted the authors to investigate a possible relationship between sarcoidosis and a specific skin response to certain metals. Thirty-five cases of known sarcoidosis, 17 cases of anthracosilicosis, and 25 healthy controls were skin-tested to 71 metals included in the eight groups of the periodic table. A 1:10,000 concentration of the metal in a 0.9% sodium chloride solution was used for the intradermal injections. Some persistent reactions did appear, the commonest being a chronic inflammatory papule occurring at the site of the beryllium injection. Another common reaction was a whitish fibrous lesion at the site of the lead injection. Some of the rare earths also caused reactions similar to those caused by the lead. However, none of the subjects tested developed clinical or histological sarcoidal reactions from the metallic salts or the inorganic compounds which were introduced into the skin.

Milkers' Nodules of the Nose Resembling Granuloma Pyogenicum. S. Epstein* and G. L. McCormick. A.M.A. Arch. Dermat. 78:391 (Sept.) 1958. (*Department of Dermatology, Marshfield Clinic, Marshfield, Wis.)

The disease known as milkers' nodules is not rare in central Wisconsin, but face lesions are generally considered exceedingly uncommon. The case report involves a 58-year-old part-time farmer who came to the clinic because of a round bluish growth which protruded from the left nostril. The lesion resembled a pyogenic granuloma, but during the course of the physical examination it was noted that the patient had another lesion on the distal portion of the left thumb. This

lesion was less elevated, had a purplish color, and presented the clinical appearance of the milkers' nodule. The patient recounted how he had noted the appearance of the lesions about two weeks previously and that during the past two months he had milked infected cows by hand.

Both of the lesions were removed surgically and were found to possess the histologic changes characteristic of milkers' nodules. The authors feel that milkers' nodules of the face may be commoner than is suspected and urged that when isolated benign vascular granulomas of the face are seen the diagnosis of milkers' nodules be excluded.

Philodendron as a Cause of Contact Dermatitis. S. Ayres Jr.* and S. Ayres III. A.M.A. Arch. Dermat. 78:330-333 (Sept.) 1958. (*2007 Wilshire Blvd., Los Angeles 57.)

Although the incidence of contact dermatitis occurring from philodendron is not high, the authors believe that these eruptions occur more frequently than is generally realized. They present case histories of 2 patients who had developed contact dermatitis from various species of philodendron, especially Philodendron cordatum. The typical eruption is erythematovesicular. It appears in blotches and streaks resembling dermatitis caused by members of the poison ivy family. All of these patients reacted strongly to patch tests conducted with philodendron leaves.

This article is timely because of the increasing use of philodendron as a decorative plant in homes and offices. In the authors' addendum, they cite another proved case of contact dermatitis caused by Philodendron cordatum which occurred in a commercial nursery employee.

Some Medicolegal Aspects of Occupational Dermatoses. Committee on Occupational Dermatoses of the Council on Industrial Health of the American Medical Association.* J.A.M.A. 168:1351 (Nov. 8) 1958. (*535 N. Dearborn St., Chicago 10.)

This article is one of a series on occupational dermatoses written by members of the Committee on Occupational Dermatoses of the American Medical Association Council on Industrial Health. It begins with a brief review of the status of workmen's compensation and then makes particular reference to certain aspects, such as specific sensitivity, new injury or recurrence, aggravation, disfigurement, patch tests, rehabilitation, and cost. Interesting examples within each of these categories were drawn upon from personal experiences of the senior author, who contributed largely to the writing of this article. A plea is made for physicians to have a deeper interest in occupational skin diseases. Workers who suffer from these disorders are ill and in need of competent care. Therefore, the fact that some physicians are not well acquainted with compensation laws, lack medicolegal training, and fear legal interrogation does not constitute satisfactory grounds for avoiding the handling of these cases. If the dermatologist, the employee, the employer, and the compensation administrator can develop better cooperation, there will be fewer claims involving controversy.

Medical Care Administration

Asa Barnes, M.D.

New Horizons for Medical Care. A. Bluestein.* National Conference on Social Welfare, Section III, May 14, 1958. (*Sidney Hillman Health Center, New York City.)

Organizing and operating a health center is not a simple undertaking. It is expensive. It is complicated in structure. It is the assumption of new responsibilities by the officers of the union in a field for which they are obviously not equipped by education and experience, namely, providing medical service for the health care of their members and dependent wives. Why did the New York Joint Board, Amalgamated Clothing Workers of America, take on so imposing a task? (1) To provide direct service medical care rather than cash indemnity insurance; (2) to establish a consumer-sponsored, lay-directed medical service program on the basis that it is the consumer group responsibility to define objectives and to review the plans of the physicians to fulfill those objectives; (3) to provide the members with medical care of the highest possible quality, without limitation of any sort; (4) to make possible the continuity of medical care for the member between the center, the hospital, or the personal or family doctor at home; (5) to stress the advantage of preventive medicine; and (6) reduce the financial burden to the patient for hospitalization and surgery.

The Physician as Advisor to Industrial Management. C. H. Keene.* J.A.M.A. 168:1851 (Dec. 6) 1958. (*Kaiser Industries Corporation, Oakland, Calif.)

The economics of the practice of medicine have been completely altered by the social forces generated out of industry in the last 50 years.

World War II froze wages and increased taxes and, thereby, prepared the way for "fringe benefits." The Internal Revenue Service ruled that cost of health and welfare programs that made up fringe benefits could be deducted as a business expense by an employer but were not considered income to an employee. In 1948, the National Labor Relations Board ruled that health and welfare plans and pensions were proper matters to be negotiated between union and industrial management. The diplomatic plant physician can do much to ensure that the present prepared programs of medical care function with effectiveness. The goal of organized labor is complete prepaid medical care for the worker, his dependents, and the retired person. If this cannot be provided within the framework of the present

system, it is likely to be secured under government auspices. Both prospects involve increased cost to industry. The second is an unwelcome prospect to the profession. What you do in industry will shape the medical practice of your sons and grandsons.

The Future Role of Hospitals in Medical Care. A. W. Snoke.* Am. J. Pub. Health 48:468 (April) 1958. (*Grace-New Haven Community Hospital, New Haven, Conn.)

Questions are being raised as to whether existing patterns in the financing, organization, and production of medical and hospital care should be changed. Hospitals presently play an important role in the control of the quality of medical care. The body upon which the quality of medical care ultimately depends is the board of trustees. The board appoints competent, qualified physicians as chiefs of staff, and chiefs of service or of specific departments, and assigns to them the responsibility of seeing that proper medical practices are maintained in the hospital. As a result, the relationship of these physicians to the rest of the staff changes. They are representatives of the board of trustees. The major role that hospitals will play in medical care in the future will be to provide an organized agency and a corporate mechanism by which doctors can set, maintain, and enforce standards of medical care that they would be unable to do as individuals.

Problems in Voluntary Insurance: Some Answers from the Windsor Experience. B. J. Darsky,* N. Sinai, and S. J. Axelrod. Am. J. Pub. Health 48-8: 971 (Aug.) 1958. (*School of Public Health, University of Michigan, Ann Arbor, Mich.)

This discussion is concerned, in part, with an analytic review of certain major problems affecting the development of comprehensive physicians' services under prepayment. The area of controversy over comprehensive benefits for physicians' services can be classified into those related to the public, those related to the physician and medical practice, and those related to the administration of the plan. About two-thirds of the physicians in Windsor report that the proportion of their income derived from the plan has increased; yet, about 80% are quite satisfied with this greater dependence. About 70% of the physicians indicate that the plan had helped them to gain a steady assured income without the hazards of collections and other uncertainties.

The statement is frequently heard that the expense of processing these low-cost claims approaches the cost of the claims themselves, so that the whole process is wasteful and self-defeating. The average processing cost per claim was 14 cents, or 2.3% of the claim.

Guiding Principles for an Occupational Health Program in a Hospital Employee Group. Joint Committee on Health Programs for Hospital Personnel of the American Hospital Association and the American Medical Association. J.A.M.A. 166: 777 (Feb. 15) 1958.

Employees in hospitals are considered to be entitled to the same benefits in health maintenance and protection as are industrial employees. It is essential that employee health programs in hospitals be established as separate functions with independent functions and personnel. The Committee avers new hospitals have a moral obligation as well as legal requirement, (*a*) to provide a safe and healthful environment for employees, (*b*) to protect employees from special risks associated with contagious disease and other hazards of their occupation, and (*c*) to protect patients from risk associated with unhealthy employees, and that hospitals should serve as examples to the public at large with respect to health education, preventive medicine, and job safety. Experience has shown that occupational health service results in healthier, more effective employees and often reduced absenteeism, labor turnover, and workmen's compensation insurance premiums. The service should be conducted by a physician as a special assignment.

About the Authors

LEONARD J. GOLDWATER, M.D. became president of the American Academy of Occupational Medicine at the Academy's annual meeting in Boston last month. He had for many years served as the Academy's secretary and is credited with much of the Academy's successful development during that period. Dr. Goldwater is professor of occupational medicine at Columbia University, a post he has held since 1952. In this capacity he has had responsibility for both undergraduate and graduate education in this specialty. In conjunction with his colleagues at Columbia he recently developed an intensive review course for physicians wishing to prepare themselves for the specialty examination in occupational medicine. Dr. Goldwater's university education began at the University of Michigan, where he received the bachelor of arts degree. His earned degrees from other institutions thereafter were, successively, from New York University, doctor of medicine and doctor of science in medicine, and from Columbia University, master of science in public health. His teaching career began in 1932 at New York University with an appointment as instructor in medicine. Later he served as assistant and associate professor of preventive medicine. After his military service with the U.S. Navy from 1941 to 1946, he joined the faculty at Columbia and served as professor of industrial hygiene from 1946 to 1952. Dr. Goldwater is certified by two specialty boards, the American Board of Internal Medicine and the American Board of Preventive (Occupational) Medicine. He has worked as senior industrial hygiene physician, New York State Department of Labor; as industrial health officer in the U.S. Navy; and is presently consultant to U.S. Department of Health, Education and Welfare, the New York State Department of Labor, the World Health Organization, and the International

Leonard J. Goldwater, M.D.

Labor Organization. Of particular interest to us here is that he founded the Work Classification Unit at Bellevue Hospital, New York, the predecessor and example for such clinics. Dr. Goldwater and Lewis H. Bronstein, M.D., are authors of the first article in this issue, "Fifteen Years of Cardiac Work Evaluation."

LEO PRICE, M.D., has been Director of the International Ladies Garment Workers' Union Health Center in New York since 1942. The large outpatient service provided at the Center offers an enormous case experience in chronic diseases of all kinds and is the source of Dr. Price's report in this issue on "A Study of the Severity of Myocardial Infarction in Garment Workers."

Dr. Price received the M.D. degree from Cornell University in 1931. Since that time he has been an instructor in cardiology at the Polyclinic Hospital in New York. He was a special consultant to the U.S. Public Health Service on industrial hygiene from 1949 to 1954 and a director of the Industrial Medical Association from 1951 to 1953.

Currently Dr. Price serves as associate clinical professor of occupational medicine at New York University; director of the New York Heart Association; member of the Sub-Committee on Medical and Legal Insurance and Industrial Problems (the Committee on Effect of Strain and Trauma) of the American Heart Association; and member of the American Medical Association's Commission on Medical Care Plans, and its Committee on Medical Care for Industrial Workers. He is certified in occupational medicine by the American Board of Preventive Medicine.

EUGENE L. COODLEY, M.D., is a native of California. He completed his undergraduate as well as his medical studies at the University of California. After a year of internship at Los Angeles County General Hospital he entered military service and served in the Pacific Theatre. Following the war he served a three-year residency in internal medicine at a Veterans Administration Hospital, and since 1949 has practiced internal medicine in Los Angeles. He is certified as a specialist by the American Board of Internal Medicine. His paper in this issue is entitled "The Cardiac in Industry."

JOSEPH B. TAUBER, M.D., DR. P.H., has since 1955 been a member of the staff of the Health Center at Aliquippa (Pa.) Works Division of the Jones and Laughlin Steel Corporation. A native of Czechoslovakia, Dr. Tauber received the M.D. degree from Charles-Ferdinand University in Prague in 1930. After hospital training and military service he engaged in general practice. This was interrupted for a course of study at the University of Prague which led to a Diploma of Public Health. Thereafter he served as a community health officer in addition to conducting his general practice.

During World War II Dr. Tauber was active in the organization and provision of medical and public health services to refugees in Poland and Lithuania, as a medical officer in the Netherlands Navy, and finally as a medical officer in UNRAA. He continued in UNRAA service in

the immediate postwar years as an administrator of general and tuberculosis hospitals and rehabilitation centers for displaced persons.

Dr. Tauber received the M.P.H. degree from the University of Pittsburgh's Graduate School of Public Health in 1953. During the next two years, as a research fellow at the School, he conducted a field study on certain relationships between heart disease and employment, for which he was awarded the Dr. P.H. degree in 1955. This work has been drawn upon for a portion of Dr. Tauber's article in this issue, "The Magnitude of the Heart Disease Problem."

Dr. Tauber is a member of the Industrial Medical Association and is certified in occupational medicine by the American Board of Preventive Medicine.

ROBERT B. O'CONNOR, M.D., author of the special article which summarizes the American Medical Association's Report of the Commission on Medical Care Plans, is Medical Director of the United States Steel Corporation. A native of Boston, Dr. O'Connor achieved his advanced education at Boston College and Harvard University. He received the M.D. degree from the latter institution in 1939.

After an internship in surgery at Boston City Hospital, Dr. O'Connor went to the Millard Fillmore Hospital, Buffalo, N.Y., as a resident in surgery. He then became a member of that hospital's surgical staff and was concurrently assistant medical director of the Buffalo plants of the Curtiss-Wright Corporation, as well as surgeon for several small plants in the area. During the years 1944-1947 he served as Medical Director of Wright Aeronautical Corporation, Paterson, N.J., and was on the attending staff of St. Joseph's Hospital as a general and orthopedic surgeon.

Dr. O'Connor became Medical Director of the Loss Prevention Department, Liberty Mutual Insurance Company of Boston in 1947. In that post he became widely known as a builder of in-plant medical services for the clients of the insurance company and appeared frequently on national scientific programs. Beginning in 1950, he volunteered his services to Harvard as assistant professor of industrial medicine and developed the course on this subject at the Harvard School of Public Health. He assumed his present responsibilities in Pittsburgh in 1956.

Dr. O'Connor is Chairman of the Health Committee, Pittsburgh Bicentennial Association; a specialist certified in Occupational Medicine by the American Board of Preventive Medicine; and a director of the Industrial Medical Association.

DAVID W. FASSETT, M.D., author of the topical review "The Evaluation of Toxicological Data," in this issue, is Director of the Laboratory of Industrial Medicine, Eastman Kodak Company. In this capacity he directs the toxicological and industrial hygiene investigations related to possible exposures to materials used and made at the several installations of the Eastman company.

Dr. Fassett received the B.A. degree from Columbia University in 1933. There followed several years of research in pharmacology and biochemistry at Columbia, New York University, and the Wellcome Research Laboratories. He graduated in medicine from New York University in 1940, and served an internship in Bellevue Hospital, New York City. After his clinical training, Dr. Fassett continued research and teaching in the department of medicine, New York University College of Medicine as a Wellcome Fellow in Therapeutics. He was acting chief of the department of pharmacology, Food and Drug Administration, Washington, D.C., for the years 1942-1945, taking part in studies on BAL. After a brief return to New York University, he engaged in private practice in Miami, Florida, from 1945 to 1948. He then joined the Eastman organization in his present capacity. Dr. Fassett's publications in pharmacologic research began to appear in 1937, while he was still in his preclinical studies, and now number about 30. These cover a list of subjects in the fields of pharmacology, toxicology, and industrial hygiene. He is associate in medicine at the University of Rochester, and associate physician on the staff of Strong Memorial Hospital.

CHARLES E. KENDALL, D.V.M., is author of the topical review "Occupational Anthrax in the United States," in this issue. Dr. Kendall's university study was done at The Ohio State University, from which institution he received the Doctor of Veterinary Medicine degree in 1956. He was for a short time a public health veterinarian in the department of health, Columbus, Ohio, before entering service with the U.S. Air Force. He served as a veterinarian at Shaw Air Force Base, S. C., until he resumed his studies, this time at the Graduate School of Public Health, University of Pittsburgh. Under a traineeship of the U.S. Public Health Service, Dr. Kendall is pursuing a study program which gives emphasis to infectious disease epidemiology.

People and Events

► JOHN MAC IVER, M.D., who joined the Medical Department of the American Fore Loyalty Group, New York City, a few months ago, is devoting himself to the full-time practice of occupational psychiatry. His specialties are in the fields of preventive medicine and psychiatry. He was formerly Director, Safety and Occupational Health Bureau of the Metropolitan Life Insurance Company.

DR. MAC IVER graduated from Rutgers University in 1944 and obtained his M.D. degree from the College of Physicians and Surgeons of Columbia University in 1949. He did postgraduate work in the Department of Psychiatry at Yale University and earned the degree of Master of Public Health in 1953.

► MELVIN M. UDEL, M.D., has been appointed Director, Safety and Occupational Health Bureau, Metropolitan Life Insurance Company, New York City. He was formerly associated with the Department of Occupational Medicine, Columbia University School of Public Health and Administrative Medicine, where his work included research, teaching, and private consultation on medical problems in industry.

DR. UDEL received his M.D. degree from the University of Maryland School of Medicine and College of Physicians and Surgeons, in 1951. In addition to general medical and psychiatric residencies, his educational background includes graduate work at Cornell University in industrial psychiatry. He has had broad training and experience in occupational health and safety, having served with the United States Public Health Service and with the Division of Industrial Hygiene of the New York State Labor Department.

DR. UDEL will be responsible for Metropolitan's program of accident prevention, including traffic and home, as well as occupational health and safety.

► LT. COL. CHARLES N. MOSS, USAF (MC), will be transferred in April to Izmir, Turkey, where he will be Hospital Commander at the Air Force Base. He is now Industrial Medical Officer, Preventive Medicine Division, in the office of the Surgeon General, Washington, D.C.

COL. MOSS graduated from Stanford University with an A.B. degree in 1940. He earned his M.D. degree at Harvard University Medical School in 1944, and did postgraduate work at the University of Vienna in 1947. From 1952 to 1954 he was Base Surgeon at Kelly Air Force Base in San Antonio. In 1955, he obtained a Master of Public Health degree from the University of California School of Public Health.

He is a member of the Industrial Medical Association, the American Public Health Association, the Association of Military Surgeons, the Aero Medical Association and the American Medical Association.

► J. A. LLEWELLYN, M.D., Chief Surgeon, Butler Division, Armco Steel Corporation, describes Armco's program in rehabilitating alcoholic employees, in a feature article in the December issue of *Target*, a publication of the Division of Addictive Diseases of the Pennsylvania Department of Health.

Through an accurate system of reporting and recording all absences from scheduled work, alcoholics were detected and indentified. Since the rehabilitation program has been inaugurated, medical department records show a marked decrease in days lost by these identified alcoholics.

DR. LLEWELLYN has been associated with Armco at the Butler, Pennsylvania, plant for 25 years. He is active in several community public health programs and has served as the chairman of the Butler Citizens Committee on Alcoholism during 1957-58. He is a District Counselor of the Industrial Medical Association.

► ROBERT E. ECKARDT, M.D., Director of Medical Research Division. Esso Research and Engineering

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People and Events

Company, and First Vice President of the Industrial Medical Association, is the author of a book just published, entitled, "Industrial Carcinogens." It is published by Grune & Stratton, Inc., New York, and is one in a series of modern monographs in industrial medicine, published primarily for the industrial physician, insurance doctor and all physicians interested in injury and illness arising from occupation.

► ROBERT H. FLINN, M.D., has joined the Occupational Health Field Headquarters of the U. S. Public Health Service in Cincinnati. He was formerly Chief of the Division of Health for the Bureau of Mines in Washington, D.C.

► The Greater New York Association of Industrial Nurses, Inc., and the Greater New York Safety Council are joint sponsors of an annual safety conference to be held at the Hotel Statler, April 13-17, 1959. The nursing section of the program, arranged by PAULINE WOHLRATH, R.N., Chief Nurse, The Port of New York Authority, will feature two speeches on the subject, "The Minor Orthopedic Problems as Seen in the Industrial Medical Clinics." Clinical management will be discussed by FREDERICK LEE LIEBOLT, M.D., Attending Surgeon in charge of orthopedics, The New York Hospital. Preventive measures will be covered by JAMES F. VAN NAMEE, Director, Engineering and Research Division, Association of Casualty and Surety Companies, New York City. A demonstration of "The Why and How in Strain Prevention" will be presented by EUGENE SCHWARZ, Senior Safety Representative, New York State Insurance Fund, New York City.

Moderator of the session will be ANN FERENCE, R.N., President, Greater New York Association of Industrial Nurses, Inc., and Assistant Executive Director, American Association of Industrial Nurses.

► At the Mid-Winter meeting of the Western New York Society of Industrial Medicine and Surgery in Rochester, the following officers and directors were elected: President: JOSEPH T. ANDREWS, M.D.; President-Elect: JAMES H. MCDONOUGH, M.D.; Vice President: MARVIN L. AMDUR, M.D.; Secretary: GEORGE A. HARDIE, M.D.; Treasurer: ELSA K. CHAFFEE, M.D.; Directors: JOSEPH C. KLEIN, M.D., ROBERT H. MEHNERT, M.D., DALLAS E. BILLMAN, M.D., and JOSEPH M. DZIOB, M.D.

► The University of Chicago has established a Section on Nuclear Medicine in the School of Medicine, to study the long-range impact of nuclear energy on matters of public health. The Rockefeller Foundation has approved support for the new unit of up to $500,000 and the University and other sources will provide additional funds. A man to take charge of the new Section is being sought, according to DR. LOWELL T. COGGESHALL, dean of the Division of Biological Sciences.

The types of problems the new Section will explore include: (1) The increase in natural background radiation due to by-products of all current uses of nuclear energy devices. (2) The actual or probable consequences—genetic and physiologic—of the increased exposure of man and domestic animals to ionizing radiation. (3) Existing and

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proposed legislative controls of factors responsible for increased exposure to radiation. (4) Medicolegal aspects of personal injury and compensation problems of personnel engaged in the nuclear energy industry, and others. (5) The psychological reactions of society to the threatening aspects of nuclear energy.

► The Occupational Health Conference held in Vancouver, British Columbia, on March 6-7, featured lectures and panel discussions on the Conference theme, "Health, Morale and the Work Force." The Conference, which was organized by the Vancouver Board of Trade and the Greater Vancouver Health League, devoted the second day to a joint meeting of the Northwest Association of Occupational Medicine and the Occupational Health Nurses of Registered Nurses Association of British Columbia.

R. H. LOWREY, M.D., Manager, Space Medicine Branch, Systems Management Office, Boeing Airplane Company, Seattle, was the Keynote Speaker. His address was entitled, "Conserving Human Resources." Other presentations comprising the meeting follow:

March 6: "Occupational Health in a Changing World"—EUGENE OWEN, M.D., Portland, Oregon; "Occupational Health Programs," a critical examination by (1) Labor—J. T. ATKINSON, Safety Supervisor, International Woodworkers of America, (2) Management—S. SIGMUNDSON, Manager, Transportation Division, B.C. Electric Co., Ltd., and (3) Health Professions—J. F. TYSOE, M.D., President, Canadian Medical Association, B.C. Division; "Fitting the Worker to the Job: (a) Preplacement (b) Special Placement," panel discussion—ANTHONY J. D'ATH, B.C. Telephone Co., Ltd., W. S. HUCKVALE, M.D., Consolidated Mining and Smelting Co., Ltd., DR. EDWARD FRIESEN, Stevenson & Kellogg Ltd., C. STEWART, Street Railwaymen's Union, and ALAN EYRE, Vice President and General Manager, Dueck on Broadway, Ltd.; "A Partnership—Health and Work"—MILDRED I. WALKER, Senior Nursing Consultant, Occupational Health Division, Department of National Health and Welfare, Ottawa; "Mental Health in Industry"—J. S. TYHURST, M.D., Professor and Head, Department of Psychiatry, University of British Columbia.

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People and Events

March 7: Panel Discussion on "Some Problems of Contemporary Industrial Society"—DR. R. A. H. ROBSON, Department of Anthropology and Sociology, University of British Columbia, and A. M. THOMAS, College of Education, University of British Columbia; Panel discussion on "Interviewing and Counseling in Industry"—(1) Basic Techniques, DR. J. S. TYHURST, (2) Specialized Applications, C. R. BROOKBANK, Co-ordinator of Training and Development, B.C. Electric Co., Ltd., and MILDRED I. WALKER; "Control of the Lead Hazard in Industry"—DR. W. S. HUCKVALE, Consolidated Mining and Smelting Co., Ltd.; "Hazards from Industrial Uses of Atomic Energy"—DR. D. H. COPP, Department of Physiology, University of British Columbia; "Living with Illness"—MURIEL SMALL, Metropolitan Health Committee, Vancouver; "Relationship of Occupational Health to Public Health Services"—DR. J. L. M. WHITBREAD, Occupational Health Division, B.C. Department of Health and Welfare.

► The Territorial Association of Plantation Physicians recently held its annual meeting in Hilo, Hawaii. At the banquet, DRS. T. D. WOO, W. B. PATTERSON, and WILLIAM BERGIN were honored with the "lei of appreciation" — an etching which tells the story of medical care in the Hawaiian plantation industry.

The technical sessions included discussions of Industrial Compensation Decisions, Evaluation of Individuals for Early Retirement or Continued Employment, Changing Problems and Newer Systems of Plantation Medical Care, Industrial Dermatosis, and a New Method of Correcting Back Pain.

Officers elected are: EDWARD B. UNDERWOOD, M.D., President; RICHARD Y. NODA, M.D., Vice-President; GARTON E. WALL, M.D., Secretary-Treasurer; and BETTY ARNOTT, Executive Secretary.

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